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*The Society is not responsible, as a body, for the facts and opinions advanced in the papers published by it.*

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## OUR MUSSOLINIS OF THE WEST

The following is gleaned from the Arizona Republican, for January 12, 1926:

The afternoon session of the meeting opened with the submission by the resolutions committee of the association of two resolutions. The first was a resolution of appreciation thanking United States Senators Cameron and Ashurst for the fight that they were waging in the United States Senate for the relief of the livestock industry of the West. The second resolution contained a request to Col. William B. Greeley, chief United States forester, to suppress publication of articles by employees of the Forestry Service against sheep grazing in the National Forests.

The exact text of the second resolution is given below:

"WHEREAS, There have been articles appearing in the press and in bulletin form for a number of years in the nature of propaganda against sheep grazing on National Forests and

"WHEREAS, Colonel Greeley, the forester, at Flagstaff last summer promised to rectify this business in the future, and

"WHEREAS, There has recently appeared in the Kansas City Star and also in the Literary Digest of January 2, either written by Dr. G. A. Pearson of the Forest Service or based upon information given out by Dr. G. A. Pearson, which article shows a bias and a malicious attempt to create a wrong impression in the public mind.

"RESOLVED, That the Arizona Wool Growers' Association respectfully requests the forester to take such steps as will prevent a re-occurrence of such articles from the pens of members of the Forest Service; and that the secretary is hereby ordered to transmit copies of this resolution to Secretary Jardine and the forester."

Yes, if the wool growers can only throttle the truth they will be secure for a long time.



# THE PUBLIC RELATIONS OF FORESTRY

By JNO. D. GUTHRIE

*Assistant District Forester (Public Relations), Portland, Oregon*  
*Awarded the Charles Lathrop Pack prize for 1925*

## DEFINITION

The terms "public relations" and "public relations counsel" are relatively new in American business life. The average man is apt to be vague as to their meaning and significance. He may think that they have something to do with publicity, the press agent, or propaganda. There is some connection, but the public relations counsel of today has a broader grasp of the interrelations of modern business, has a finer conception of his functions, and has his code of ethics; he is a very different individual from the old time press agent. The public relations counsel, or director, is a new profession which during the past ten years has grown up and extended its field of usefulness in a remarkable degree, touching upon intimate and important phases of modern life. The director of public relations has the confidence of his client and the public, because he is honest with both, which could not be said always of the old time press agent.

Public relations has been well defined as "the process of finding out, and of making known, the factors in an enterprise which are of public interest."<sup>1</sup> The public relations of forestry may, therefore, be said to be the finding out and making known the facts and principles of forestry which are of interest and value to the public.

Naturally, all public relations work is motivated. For forestry, it is to awaken public interest and quicken public understanding in forestry, with the motive that there may be built up a nation-wide support for the practice of forestry principles. The great need today for the permanent good of American forestry is its popularization.

Naturally also, the above objective is considered a worthy one, unselfish, non-commercial, a public service effort. All this will be granted, at least by those within the profession.

## A MODERN TOOL

Public relations is the liaison between the enterprise or cause and the public. Its obvious objective is the molding of public opinion favor-

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<sup>1</sup> "Public Relations"—J. C. Long, 1924, McGraw-Hill Co.

able to the cause espoused. A broad view of public relations comprises not only the effort to get a public hearing, but the responsibility of having something worth saying, and observing conditions and standards of ethics making for a sound public policy. That there is a necessity for having a code of ethics in public relations work is evident.<sup>2</sup> One has been provided, which is:

1. Public relations or publicity must be true.
2. It must be honestly presented without attempt to conceal its source.
3. It must be interesting.
4. It must be intelligent.
5. It must never be self-laudatory.

Briefly, it is simply putting the facts before the public which is to be the judge. Surely, forestry, if rightly presented, can stand the test.

So valuable has he become that the public relations counsel, or director, is now a recognized agency in many large American businesses. The listing of a few of the important concerns which have public relations departments is convincing. The American Telephone and Telegraph Company, the Northern Pacific Railroad, the Seaboard Airline Railway, the Motion Picture Corporation of America, Harvard University, the Trade Association Executives of New York, made up of state, territorial and national trade associations, such as the National Hardware Manufacturers' Association, American Protective Tariff League, National Association of Credit Men, the Atlantic Coast Shipbuilders' Association, and some seventy-five other member associations of the Trade Executives. The railroads in recent years wisely realized that their most important problem was "to sell themselves to the public," and are spending millions in doing it.

The business house, the railroad, the public institution or cause, any enterprise which wishes to reach the public's ear in these days must use the modern means of communication. Modern competition is tremendous in every line. Not only is this true in the commercial world but the struggles between causes, uplifts, leagues, and movements, all philanthropic, or at least non-commercial, has become so keen that that cause which would gain public understanding and support must adopt the means and methods in use by its competitors, or be shoved aside and forgotten in the crush.

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<sup>2</sup> "Public Relations," J. C. Long, pp. 2, 13.



## FORESTRY AND PUBLIC RELATIONS

Forestry as a public enterprise in America may be said to have just begun. Only fifty years ago was the first appropriation made which was directly concerned with forestry. Under our system of government, both state and national, great causes grow slowly, dependent as they are on public support. Legislatures and Congresses are slow to act unless there is a strong urge for the cause manifesting itself in no uncertain terms.

Great national movements such as forestry must depend on popular rather than scientific support. Hence the cause of American forestry practically from its inception as a governmental activity in 1878, until about 1905, suffered not because of the support of scientists but rather because of lack of support by the public generally. Prior to 1905 the science of forestry was perhaps over-emphasized and the American people comprehended it not. From then on for some five years a strong popular appeal was made.

The statements from the Forester's Annual Report for 1905 are interesting in this connection:

"During the past year it has become more evident than ever before that to secure the full benefits of the progress in technical forestry made by the Service an active campaign of popular education is called for \* \* \* \*

"Through the press, through the avenues of education opened by school instruction and industrial training, through concrete example, and through the regular publications of the Service, popular opinion must be formed and the knowledge of what constitutes the right use of forest land must be widely inculcated."

It is significant that this change in public relations methods (propaganda, it was formerly called, which term had not yet acquired its present sinister character) of that day was coincident with the transfer of the federal forest reserves to the U. S. Department of Agriculture. From about 1910, technical forestry was again emphasized until in 1918 when a determined drive for a national forest policy was begun, resulting in the Clark-McNary Act of 1924. In 1920, came the establishment of a branch of public relations in the U. S. Forest Service.

The early forestry publications by the government were, for the temper of the public mind of that day, perhaps too technical in character and hence were read, if at all, only by scientists. Forestry was of academic interest, necessary perhaps in Europe but nothing to worry

about in this country. There was an occasional cry of timber famine in the seventies, but it fell mostly on deaf ears. Here credit should be given to the unceasing activities of the American Association for the Advancement of Science and the American Forestry Association, real pioneers in American forestry propaganda. The American Forestry Association first in 1889 and since has been most active in urging in every way possible the popular support of forestry and the setting aside of adequate forest reserves. It is most unfortunate that this association has never received the full support of foresters which it so well deserves.

It is significant here also to note two outstanding public relations of that earlier day. One was the repeated emphasis on the relation of rainfall and forests which, fallacious as it was, won many to the cause because of its very popular appeal. Here was something that touched the daily lives of many Americans, certainly of the Middle and Far West; it caught their interest, and one result was the Timber Culture Act of 1873. The other, far more important in its relation to forestry, was the starting in Nebraska in 1872, by J. Sterling Morton, of an Arbor Day. This annual event quickly became popular and has spread not only throughout the United States but to many foreign countries and is still universally observed.

American forestry will make progress only when and until it is supported by an intelligent and widespread public opinion. It is not enough that a few, however burning with zeal for the cause, shall back it; the great mass of the people must know something about what it means. This is true for communities, for states, and for the nation. Foresters as professional men have ever been too reluctant to recognize this, with the consequent tardy acceptance by the public of the principles of forestry through a half-century of effort.

In the early days of this country a citizen could bring his ideas before the town meeting to be accepted or rejected by his fellow-citizens as these ideas were sound or unsound. With the stretching of our nation's boundaries, the growth of population, the multiplicities of modern life and its social complexes, no such ready opportunity exists. The means of making oneself heard have likewise become more numerous, but more complex and difficult. The forester if he has a message worth deliverance, and if he believes in his cause, must avail himself through the means the present day offers. He can not wait for the public to ask for his wares; it is being besieged by other pleaders for every imaginable cause.



## THE PRESENT SITUATION

What is the present status of American forestry? In retrospect, the growth of public sentiment for forestry has been truly phenomenal. Much progress has been made since 1878. The federal government is practising forestry on the National Forests, so far as its opportunities and appropriations permit. The area under the U. S. Forest Service is now some 165 million acres, with \$6,731,489.00 appropriations for the fiscal year 1925, and receipts for 1924 at \$5,251,903.00. For 1905, the figures were: an area of 97,773,617 acres, \$767,219.00 receipts, and an appropriation of \$979,519.00. Many states have foresters or forestry commissions backed by large appropriations and are securing real results in both popular support and accomplishments in the woods. Today thirty-five states have foresters or forestry commissions, as compared with fourteen in 1905. There were five forest schools back in 1905, with eleven others giving courses in forestry. Now there are twenty, with thirty-eight giving forestry courses. Now there are nine forest experiment stations engaged in research; in 1905 there was none. There are now 5,550,824 acres in state forests, 112,480 in state parks, and 453,979 acres of municipal and county forest lands.

The Reforestation Act (Clark-McNary) of 1924, the results of a five-year intensive public educational campaign, lays the foundation for a sound national and state forest policy, emphasizing strongly the co-operative feature in protection, timber taxation study, planting, public education, and land classification. The private timber owner is recognized at least as requiring federal help in protection of his forests as an important part of the nation's supply. There has followed this Act an active legislative effort on the part of states to qualify under it. There are new state foresters almost every few months. Foresters in private practice are finding jobs to do. Some lumber companies have actually begun to practice forestry; many more are earnestly looking into the question of forestry and will begin if they can see that it will pay them. Forestry and fire associations were never so numerous nor so flourishing. A rosy picture, truly!

## THE REVERSE SIDE—SMOKE

In spite of the rosy picture sketched above, American forestry is not yet in its Golden Age. The rosy picture is entirely hidden at times under clouds of smoke from burning forests. Perhaps the public's vision of forestry is also hidden by this smoke pall.



For the single year of 1924, alone, the American forest fire figures appall by their enormity. In the United States (exclusive of Alaska) there were 91,921 forest fires reported, with many more undoubtedly not of record. Of these 86,485 were man-caused, of which 20,845 were incendiary—wilful acts—by far the largest of all causes for that year! What a terrible travesty on our efforts at public education in fire prevention!

Brush-burning came second in the list of causes, with 15,991, and smokers third, with 12,854 to their credit—three absolutely indefensible causes. Lightning caused a paltry 5,436, next to the lowest figure in all the list of causes.

Let us look at the damage figures. For 1924 alone, the damage to timber was \$31,415,037.00, with other property damage amounting to \$6,713,389.00, a staggering total of \$38,128,426.00 worth of wanton loss, over 90 per cent of which might well have been prevented. Forest land to the extent of 22,200,007 acres was burned over, with a total area burned of something over 28,822,735 acres. And our annual fire bill is something over \$500,000,000, for fighting forest fires, for fire equipment and supplies, for protective improvements, and for property destroyed—the nation's property, our property, which rolls heavenward in black columns. As E. T. Allen pertinently asks:<sup>3</sup>

"Has it ever occurred to you that we are the best fire-fighters in the world, of which we are inclined to boast, just because we lead the world in permitting fires on which to practice?"

Our boasts of national and state forest acreages, our annual forestry appropriations which run into millions, our increasing number of forest schools, and experiment stations, all are blotted out by the smoke from these 90,000 fires. Perhaps foresters themselves have become lost in this smoke, and clamor for more money and more men to fight forest fires, for newer and better equipment, for more lookout towers, for more pumps; while the careless and the vicious are abroad in the forest stands, both virgin and young growth, scattering fire-brands or tossing smoking cigarettes. We have been too busy fighting fire to find the man who started it. We have been too busy devising new fire equipment and tools to educate the ignorant and careless in the ways of the woods *before* they go into them.

If forest fire prevention is 90 per cent of forestry in America today then the first duty of every forester is public education in forest fire

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<sup>3</sup> "50,000 Firebrands," E. T. Allen, American Forestry Association.

prevention. Without that, silvicultural systems, research plats, growth and yield tables, intensive timber and range plans, all may be useless, for after the red scourge has passed there is nothing left except these figures—on a piece of paper. Forest laws are needed in many states, but far more is the crying need to enforce those already on the books—some of them so ancient that they have been forgotten. The American people must be made fire-conscious; they must stop the careless, the ignorant, the vicious, in their wild orgy of burning timberlands. And an outraged public opinion is the only tool that will accomplish this, a conception by all respectable citizens that the man who negligently or ignorantly is responsible for a forest fire, be he camper, hunter, logger, stockman or farmer, is to be classed with the thief and the killer, an enemy of society.

Squarely upon the shoulders of the American forestry profession rests the responsibility for the public education to stop this annual holocaust; it can not be shifted nor evaded longer.

#### THE OBJECTIVES

Succinctly, these are some of the objectives toward which any public relations effort in American forestry should strive:

1. Crushing out the incendiary.
2. Reduction to 25 per cent or less the percentage of man-caused fires.
3. The compulsory teaching of forest fire prevention and forestry in all secondary and high schools in every state having a state forestry department.
4. Revision of timber tax laws in each state, where needed, to encourage the growing of forests.
5. Putting the 90 million acres of idle lands in the United States to work growing timber.
6. Encouragement by moral and financial support of forest research, by the federal and state governments and by forest schools.
7. Closer utilization of products of the forest to eliminate the present enormous waste in woods and mill, which represents a tremendous and unnecessary drain on forest wealth.
8. Thorough support of existing forestry associations, agencies and publications, whether national or local, in their campaigns for a wider diffusion of forestry knowledge.



9. For an adequate system of national, state, community and town forests throughout the nation, and their use, first, for the production of timber; second, for public recreation and refuges for wild life.
10. Thorough and systematic co-operation between federal, state, and private forest owners in carrying on a nation-wide campaign of public education in forestry and forest protection and the setting aside of commensurate annual budgets therefor; this perhaps should head the list of objectives.

#### THE TOOLS OF PUBLIC RELATIONS

These objectives will be approved and supported by the American public if American foresters will but use the public relations tools at their hands. Public relations makes use of all present day means of reaching the public. These are the tools or instruments by which are broadcasted facts and ideas to the public: news items, news articles, interviews, magazine articles, speeches, circular letters, leaflets, booklets, map folders, handbills, streamers, buttons, calendars, signs, meetings, parades, exhibits, window displays, special "weeks," motion pictures, radio, lantern slides, photographs, and "whatever other mediums there are through which public opinion is reached and influenced."<sup>4</sup> These are some of the tools ready for the forester's use.

#### THE PRESS

This includes the daily, weekly and Sunday newspaper, news and feature syndicates, journals and magazines of every description. There are some 2,300 daily newspapers listed as published in towns and cities of the United States, of which some 175 are published in cities of over 100,000 inhabitants. The number of small weeklies is naturally far larger. There are three national press associations which deal with important news of the day, the Associated Press, United Press Association, and the International News Service. Of general newspaper syndicates there are some 48 in the United States. The press today offers the largest single means of contact with the public. It is also the most powerful in molding public thought. It, therefore, presents the largest single opportunity for public relations effort in forestry.

The volume of printed material mentioned above which goes out from the printing presses into the homes and business houses of this

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<sup>4</sup> "Crystallizing Public Opinion," by E. L. Bernays, 1923, Boni & Liveright.

country is perfectly enormous—all borne on pulp, a product of the forest. It may be assumed that every word, every line, in this enormous volume of printed material is read by some one of the millions of Americans. Each one of these readers may be affected by what he reads in his paper; psychologists say that over 80 per cent of the American public today accept their opinions as they are given them by the press.

Material to be acceptable to the editor must be prepared in one way for the newspaper, in another way for the magazine. Different newspaper editors prefer a certain type of news, put up in a certain style. Magazine editors are as different as their magazines.

Foresters as a class are prolific writers; they are also as a class prone to shroud their thoughts in technical terms and high-sounding language, both fatal to a popular understanding. This is characteristic of the scientific mind. Few foresters have the ability to express themselves in simple, clear English, readily understood by the lay reader. And yet the forest and all that goes on within it, has perhaps a wider appeal to the popular interest than any other subject. The mystery of the growing tree to maturity, of its reproducing its seed from which will spring anew like trees with like branches and leaves and seed, holds alike for young and old an ever present interest. Forestry, the growing and tending of trees for human needs, is a story which has almost a universal appeal. What a wonderful opportunity is here presented to the forester, to interpret all this in clear language for the popular reader!

Never was the American editor so interested in forestry. And never was he so willing to give the story to his readers, if he can only get it in usable form. The forest, in the generic sense, is an unworked field. It is teeming with stories of human interest, of adventure, of science, of beauty and charm, of struggles for existence of the trees and the wild life within it. The forester must give these stories form, and in so doing he will be winning friends for forestry because he is interpreting the forest to the people.

Here a word might be said on personal publicity. Foresters, true to the high standards of their profession, dislike personal publicity. Nothing in the end may be more fatal to an individual or to an organization. However, it must be recognized as one of the cardinal principles of the daily press that a news story, certainly if an opinion is expressed therein, must be tied to some person. Without the personal element, the news story is lifeless. There is a middle course between personal



boosting and being quoted as to one's views on forestry questions. No forester should therefore object to being referred to in connection with his profession. If the forester has knowledge which the public should have—and he has—surely here is both duty and responsibility for him.

There is also this to remember, that scientists no longer work in cloistered halls, hiding their results from a too curious world. Rather the modern scientist gives to the public from time to time the results, however inconclusive, of his delvings. The windows of the laboratory are now open to all the world.

More popular articles on what forestry is and less abstruse, technical bulletins is the crying need today for the profession in America.

#### TALKS

The spoken word is always more effective than the written, and yet to relatively few foresters comes the opportunity to reach very many through this means. The lecture platform or the Chautauqua tent is rarely available for him.

There was never, however, so broad a field as there is today to talk. All over this fair land of ours at noon each day are countless thousands giving luncheon talks, on every conceivable subject, and some on no subject at all. Call them "Babbitt meetings" if you will, still hard-headed, serious-minded business men are present and talking, thereby helping to form public opinion on some subject. It is indeed a small town these days which has no chamber of commerce and no noon luncheon with a program of speakers! Here is another opportunity for the forester; all the other scientists are at the noon table and talking volubly learnedly!

The illustrated talk is also flourishing, and the easiest to give, if one is apt to have stage-fright. Forestry lends itself peculiarly well to this class of talk and always, everywhere, finds a welcome. There is no end of opportunity to give forestry talks. There is no better nor any field more productive in results than schools. The child mind as well as that of the youth is most receptive to anything about the forests. Here is a chance to start forest education, for the school children of today should have the opportunity which their parents probably never had of learning the lessons of forestry; theirs will largely be the problem of forest use and conservation to solve.

Schools, women's clubs, luncheon clubs, lodge meetings, social and civic organizations, Boy and Girl Scouts, conventions, outdoor clubs,

game protective associations—there is no limit for the forester who is willing to tell an interested public what forestry is. But there are few so willing, for the forester, shy, scientific soul, is loath to stand on his feet and talk about his work. The field is broad and the field is open, the public is interested and waiting. Until more of us realize that we must preach as well as practice forestry, the cause will continue to lag.

#### EXHIBITS

Throughout the United States each fall there are held state and county fairs, almost in every county, and certainly one in each state. Outside of these there are conventions, meetings, gatherings innumerable, where people congregate for a few days to talk and resolute to reform the world. At most of these there are graphic representations of ideas, of plans, of uplifts, all having for their object the education of the mass by the exhibit method. And then there are the travelling exhibits which go by train or truck to the people. All these methods are but tools in mass education. All these offer opportunities to bring forestry to the American people. Models, displays, exhibits, whether at fairs, conventions, or in store windows, attract the popular interest many times far more effectively than the written or spoken word. The eye learns more readily than the ear. To see is to believe. If there is motion, vivid color, or noise, with an exhibit, it is all the more popular with the crowd.

The U. S. Department of Agriculture prepares and ships over the country annually many exhibits but these are shown only at a few state fairs. State foresters, either directly or through agricultural extension agents, should show at every county fair in their states some sort of forestry exhibit or display. The U. S. Forest Service and forestry associations should co-operate wherever feasible in such state exhibits. While the number of persons reached at a county fair is smaller than at state or larger fairs, the amount of attention devoted to forestry displays by the individual is far greater; there is not the competition, and hence the results in public education are more lasting.

#### MOTION PICTURES

"Pictures have always been the surest way of conveying an idea, and next in order, words that call up pictures in memory," says Lippmann.<sup>5</sup>

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<sup>5</sup> "Public Opinion," Walter Lippmann, 1922, p. 162.



Next to the newspaper the motion picture today reaches the greatest number of people in this country. Motion pictures are generally considered of two kinds, theatrical, and non-theatrical or educational. The lessons of forestry, what forest destruction spells, what forest conservation means, the life of the forest, are but a few of the many stories that wait to be presented on the screen, whether in the theatrical or educational form. In only one screen story (from Harold Titus' book "Timber") has forestry been even fairly accurately presented as yet.

The forest stories must, perforce, be interwoven with adventure, human interest, action, for use on the silver screen, and yet all these things are there, and more. The forest fire, because of its dramatic values, has often been seized upon for presentation but never so far adequately featured. Why has not the broad field of forestry been utilized? Largely because foresters, the men who know the stories, have kept them to themselves. As a profession they must come to realize that here is a way of reaching millions with the message of what the forest means in the life of a people.

Forestry naturally presents a tremendous field for educational pictures, and this field has been to some extent exploited by the Forest Service and certain state forestry departments, and fire associations, notably with "Red Enemy." There is a wide demand for such films from schools, Boy and Girl Scouts, outdoor clubs, game associations, as well as the public generally.

#### RADIO

Here is the latest tool to be added to those already waiting for the forester's use. Its very novelty brings many millions nightly to tune in on distant music or talk. The broadcasting stations, of which there are over 400 at present in the United States, are hard put at times to provide interesting numbers for their programs. The radio audience will not tolerate commercial advertising, nor will it long listen in on long-winded talks. When foresters learn to present their stories in a form which will interest and entertain, then the radio managers will welcome them to their list of performers. Already the radio has been used to some slight extent by foresters, especially during American Forest Week observances.

#### AMERICAN FOREST WEEK

This special week, an annual event now since 1920, offers the one big outstanding opportunity to every forester and friend of forestry in America to help mightily. Of the observing of "weeks" there is no end

and yet here is one with no taint of commercialism and one of the very few honored each year by presidential proclamations. From its modest origins in the Pacific Northwest in 1920, as Forest Protection Week, it has spread until it is truly a nation-wide event, with a permanent national committee, and backed by some 90 of the leading philanthropic, civic, fraternal, and public service organizations of the nation.

Schools look forward to it and plan for it, Boy and Girl Scouts participate, the press gives it whole-hearted support and valuable space, civic clubs include it on their programs. In 1925, as never before, chambers of commerce took the leadership in thousands of communities in observing it. It is a week in which public relations does its most effective public educational work. Plans far ahead are necessary, such as the selection of state committees, laying out the plan of the campaign, collecting and preparing material, arranging for speakers' bureaus, window displays, special programs and printed material. Foresters, whether in federal, state, or private employ, should seize this opportunity of all the year to popularize forestry and educate the public in forest protection.

#### SOURCE MATERIAL

Every forester should know what source material there is dealing with the mechanics of the work of public relations; certain of this source material he should not only read but should keep on his book shelf, for ready reference. Because public relations covers such a broad field of human contacts, the list of manuals, instructions and handbooks on the various phases of the work is a long one. Publications of especial value are starred (\*) in the bibliography given below, which, so far as is known, is the first one ever set down.

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## THIRTY-FIVE YEARS OF NATIONAL FOREST GROWTH

BY E. A. SHERMAN

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The first of our great system of government forests, now known as "National Forests," was created by President Harrison March 30, 1891. It was known as the "Yellowstone Park Timberland Reserve" and had a total gross area of 1,239,040 acres. The total net area of government land in National Forests June 30, 1925, was 158,395,056 acres. Undoubtedly foresters will quite generally be interested in tracing the growth of our National Forest properties during the thirty-five years intervening between these two extreme dates.

Official data, heretofore available only in widely separated records, have recently been assembled by the Forest Service for each fiscal year beginning with 1891 and ending with 1925. The total gross and net area table, as most recently and carefully computed, appears on the following page. This information already has considerable historical interest. In time it is divided into two major periods: (1) The era of administration by the General Land Office of the Department of the Interior dating from the beginning and ending March 31, 1905; (2) The era of administration by the Forest Service of the Department of Agriculture beginning February 1, 1905, and continuing down to the present time.

The "Yellowstone Park Timberland Reserve" was created by a Presidential proclamation under authority contained in Section 24 of the Act of March 3, 1891 (26 Stat., 1095). Unless authorized by some special or supplementary legislation, National Forests or additions thereto are still established under this law. It is therefore of interest to quote its creative section, which reads:

"Sec. 24. That the President of the United States may, from time to time, set apart and reserve, in any State or Territory, having public land bearing forests, in any part of the public lands wholly or in part covered with timber or undergrowth, whether of commercial value or not, as public reservations, and the President shall, by public proclamation, declare the establishment of such reservations and the limits thereof."

## AREA OF NATIONAL FORESTS 1891 TO 1925, INCLUSIVE

Year	Gross Area Acres	Net Area Acres	Gain or loss in area compared with preceding year Acres
1891 .....	1,239,040	.....	.....
2 .....	3,252,260	.....	+ 2,013,220
3 .....	13,053,440	.....	+ 9,801,180
4 .....	17,564,800	.....	+ 4,511,360
5 .....	17,564,800	.....	.....
6 .....	17,564,800	.....	.....
7 .....	18,993,280	.....	+ 1,428,480
8 .....	40,719,474	.....	+21,726,194
9 .....	46,021,889	.....	+ 5,302,415
1900 .....	46,772,129	.....	+ 750,240
1 .....	46,410,209	.....	— 361,920
2 .....	60,175,765	.....	+13,765,556
3 .....	62,354,965	.....	+ 2,179,200
4 .....	62,763,494	.....	+ 408,529
5 .....	85,852,229	75,352,175	+23,088,735
6 .....	106,994,018	94,159,492	+18,807,317
7 .....	150,832,665	132,731,865	+38,572,373
8 .....	167,976,886	147,819,660	+15,087,795
9 .....	194,505,325	172,230,233	+24,410,573
1910 .....	192,931,197	168,028,752	— 4,201,481
1 .....	190,608,243	168,165,163	+ 136,411
2 .....	187,406,376	165,027,163	+ 3,128,000
3 .....	186,616,648	165,516,518	+ 489,355
4 .....	185,321,202	163,848,524	— 1,667,994
5 .....	184,505,602	162,773,280	— 1,075,244
6 .....	176,088,608	155,399,809	— 7,373,471
7 .....	176,340,353	155,220,429	— 179,380
8 .....	175,955,771	155,374,602	+ 154,173
9 .....	174,261,393	153,933,460	— 1,441,142
1920 .....	180,299,776	156,032,053	+ 2,098,593
1 .....	181,820,459	156,666,045	+ 633,992
2 .....	181,799,997	156,837,282	+ 171,237
3 .....	182,099,802	157,236,807	+ 399,525
4 .....	182,817,159	157,502,793	+ 265,986
5 .....	184,125,912	158,395,056	+ 892,263

Net areas for 1905 to 1912, inclusive, are estimated.

\* Prior to 1906 the gain or loss is of gross areas.

The growth of our National Forests has been profoundly influenced by seven other Acts of Congress: (1) The Act of June 4, 1897 (30 Stat., 11), explicitly determined and limited the purposes for which reservations may be made under the Act of 1891, and also made provision for their administration. From the standpoint of area and growth these limitations are fundamental, have never been repealed or modified by Act of Congress, and therefore hold good today exactly as when first enacted. In consequence it is worth while to here quote the basic statement, which is: "No public forest reservation shall be estab-



lished, except to improve and protect the Forest within the reservation, or for the purpose of securing favorable conditions of water flows, and to furnish a continuous supply of timber for the use and necessities of citizens of the United States." (2) The Act of February 1, 1905 (33 Stat., 628), transferred the National Forests from the Department of the Interior to the Department of Agriculture, where they have since been administered by the Forest Service. This stimulated growth. (3) The Act of March 3, 1907 (34 Stat., 1256), provided that thereafter forest reservations might be created in the States of Oregon, Washington, Idaho, Montana, Colorado, and Wyoming only by act of Congress. This restricted growth. (4) The Act of March 1, 1911 (36 Stat., 961), otherwise known as "The Weeks Law," authorized the purchase of forest lands on the headwaters of navigable streams, appropriated funds for that purpose, and consequently stimulated area increases. (5) The Act of August 10, 1912 (37 Stat., 269), provided for the classification and segregation of agricultural lands from the National Forests, appropriated funds for carrying on the work, and accelerated the final determination of true forest lands. This resulted in a material decrease in gross area, accompanied, however, by a desirable stabilization of the remainder for forest use. (6) The general land exchange act passed by Congress March 20, 1922, authorized the Secretary of Agriculture to acquire any privately owned land chiefly valuable for timber production or watershed protection and lying within the boundaries of the National Forests by giving in exchange not to exceed an equal value of National Forest land or timber. This is enabling the government to consolidate its holdings, concentrate its values into timber-producing properties, and develop sound forest management plans based upon certainty of operation and control. This law promises, if wisely exercised, to be the most helpful authority ever conferred upon the Service—helpful both to the public and to the private owners and operators. (7) Finally the Act of June 7, 1924 (Clarke-McNary Law), will have important influence on National Forest areas. Already there has been added to the National Forests a total of 354,509 acres from military reservations under the provision of Section 9 of that Act.

In addition to the foregoing Acts of Congress a number of unofficial reports and decisions have tremendously affected the growth of our National Forests. First among these should be placed the report of the committee appointed by President Wolcott Gibbs of the National Academy of Sciences, at the request of Secretary of the Interior, Hoke Smith,

who desired that such committee outline a forest policy for the forested lands of the United States. In addition to President Gibbs, this committee consisted of Professor Charles S. Sargent, Director of Arnold Arboretum at Harvard University; General Henry L. Abbott, United States Engineer Corps; Professor William H. Brewer of Yale University; Mr. Arnold Hague of the United States Geological Survey; Mr. Alexander Agassiz, and Mr. Gifford Pinchot. This report, which outlined a plan of administration and recommended the establishment of 13 additional forest reservations containing an aggregate area of 21,379,840 acres, was transmitted to the Secretary of the Interior May 1, 1897, and resulted in the passage of the Act of June 4, 1897. Its immediate influence is directly reflected in the increased area of the National Forests as shown by the figures for 1898.

The influence of Mr. Pinchot's dynamic energy and the conservation policies of Roosevelt are shown in the tremendous increases in net area between 1905 and 1909, an increase of over 96,000,000 acres in net area and over 108,000,000 acres gross area.

These additions were necessarily made in extreme haste, as the more valuable timberlands were being swiftly appropriated by the large lumber companies. Mr. Pinchot realized that additions made so hastily required careful reconsideration, and in the spring of 1909 ordered that a careful re-examination of all National Forest boundaries be immediately undertaken, with a view to eliminating therefrom any lands failing to meet the requirements of the Acts of 1891 and 1897, and of adding thereto any adjoining unreserved public lands which, upon examination, were found to meet such requirements. This work as begun under Forester Pinchot's administration was continued and completed under the administration of Forester Graves. In addition this re-examination was given an inter-Departmental standing by reason of an agreement jointly signed by Secretary James Wilson for the Department of Agriculture and Secretary Richard Ballinger for the Department of the Interior, and approved by President Taft. This agreement defines the character of lands contemplated for inclusion in National Forests by the Acts of 1891 and 1897, and is still in effect, or at least has never been revoked or modified. It provided as follows:

1. Lands wholly or in part covered with brush or other undergrowth which protects stream flow or checks erosion on the watershed of any stream important to irrigation, water power, or to the water supply of any city, town, or community, or open lands

upon which trees may be grown, should be retained within the National Forests, unless their permanent value under cultivation is greater than their value as a protective forest.

2. Lands wholly or in part covered with timber or undergrowth, or cut-over lands which are more valuable for the production of trees than for agricultural crops, and lands densely stocked with young trees having a prospective value greater than the value of the land for agricultural purposes, should be retained within the National Forests.

3. Lands not either wholly or in part covered with timber or undergrowth, which are located above timber line within the Forest boundary or in small bodies scattered through the Forest, making elimination impracticable, or limited areas which are necessarily included for a proper administrative boundary line, should be retained within the National Forests.

4. Lands not either wholly or in part covered with timber or undergrowth, except as provided for in the preceding paragraphs, upon which it is not expected to grow trees, should be eliminated from the National Forests.

The influence of this re-examination is reflected in the area figures beginning with 1910 and ending with 1919. It will be seen that during this ten-year period there was a steady decrease in net area in the National Forests each year as compared with the preceding year, with the apparent exceptions of 1911, 1913, and 1917. These exceptions are more apparent than real and are largely the result of different methods of computation. Prior to June 30, 1913, the area tables were very defective, net area being estimated rather than actually determined. The apparent increase in 1911 results from a revised estimate which was adopted January 1 of that year. Although the official table shows an increase in gross area that year amounting to over 2,600,000 acres, what actually happened was that during the year Presidential proclamations added 2,806,267 acres to the gross area in National Forests and eliminated 4,598,705 acres, a net decrease of 1,792,438 acres in gross area. It consequently follows that the figures for both net and gross area in preceding years had been somewhat underestimated. However, since these are the figures used in official reports it would be footless to make any attempt subsequently at back-dating corrections. The figures, therefore, stand as official, although known to contain this unavoidable factor of error. It took a vast amount of clerical work covering a



period of years to compile complete title status records for all the National Forests, and at best errors were unavoidable because of constant changes in status. However, complete figures were available June 30, 1913. The figures from 1913 on were constantly brought to greater and greater degrees of accuracy. The apparent increase in 1913 results from the first actual determination of net area, and the increase shown for 1917 results from the inclusion in our figures for the first time all lands purchased under the Weeks Law. As a matter of fact, the actual net area of National Forests created from the public domain decreased during that year, as well as every other year between the period 1910 to 1919, inclusive.

Beginning with 1920 the tide turned and each year shows a more or less substantial increase. The figures of net gain, however, do not tell the entire story, for the reason that in addition to excluding from the National Forest lands unsuited for forestry purposes, the Forest Service has been steadily carrying on work with the different states whereby the states of South Dakota, Montana, Idaho, Washington, and Oregon, are acquiring comparatively compact bodies of National Forest land equivalent in area and value to the Sections 16 and 36 which the states lost title to by reason of their inclusion within National Forests. Each such exchange has made a reduction in National Forest net area by excluding lands equal in value to the lands lost by the state. At the same time each such exchange liquidates an obligation which can not again be charged against these properties. Correspondingly, many other clouds upon the title to our National Forest lands are being removed, in some cases resulting in loss of net area, in other cases resulting in increases.

The high tide of National Forest net area was reached June 30, 1909, with a total acreage of 172,230,233 acres. The ebb tide was June 30, 1919, with 153,933,700 acres, a decrease of 18,296,533 acres. Of this amount, however, there were 2,497,840 acres of Indian Reservation timber lands, the inclusion of which within National Forests was revoked on account of doubtful legality.

No pessimistic conclusions should be drawn from this reduction in acreage from the high tide of 172,000,000 acres of 1909. With the single exception of 1912 when the Indian Reservations were eliminated, the National Forests at the close of each year were more valuable for the primary purposes of timber production and watershed protection than at the close of the preceding year, no matter how this net area

may have shrunk. The lands eliminated were usually of low or doubtful value for permanent forest production, while the lands added either by purchase, proclamation, or Act of Congress were of unquestioned forest character. Today the National Forests are capable of producing more timber per annum and contain a greater volume of merchantable timber than ever before in their history.

The reader will understand that the chronological area table is not presented as of absolute accuracy because that was unattainable at the time the area records were compiled. Only gross areas are available for the period of Land Office administration. Net areas shown from June 30, 1905, to June 30, 1912, inclusive, are estimated, but are fairly accurate. From 1913 on the figures are dependable.

## THE ATTACK ON THE FOREST SERVICE GRAZING POLICY\*

BY GLEN A. SMITH

*Assistant District Forester, Missoula, Montana*

Members of the Society of American Foresters are fully aware of the vital danger which is only partially concealed in the recent attack by a select Senate Committee headed by Senator R. N. Stanfield, on the present grazing policy of administering National Forest lands. There can be no doubt but that this attack, while aimed primarily at the Forest Service, has as a goal the undermining of one of our fundamental policies of conservation of natural resources. As an organization, composed of foresters working in all sections of the United States, the Society of American Foresters has an extremely great interest in this attack. Grazing has long been recognized as an integral part of forestry and the same fundamental principles of the conservation of forage crops apply also to timber crops.

Our national policy of conservation has been evolved largely during the past half century. It was President Roosevelt who, in his several messages to Congress, crystallized and clearly established in the national mind what conservation is and what it can accomplish.

In his words "The policy of conservation is, perhaps, the most typical example of the general policies which our Government has made peculiarly its own. It is in line with the general functions of our Government to insure to all its citizens, now and hereafter, their rights of life, liberty, and the pursuit of happiness. If we of this generation do not conserve and wisely handle our resources from which our children would otherwise derive their livelihood, we reduce the capacity of our lands to support a nation of our magnitude and so either degrade the American standard of living or deprive the coming generations of their right of life and pursuit of happiness on this continent. And what is of equal importance is to prevent great industrial organizations from exercising unregulated control of the means of production of the necessities of life."

The policy of administering the grazing resources of the National Forests has been to conserve, yet wisely to use, the annual forage crops which are so valuable in the production of meat products, wool, hides, etc. Administration has been designed to perpetuate the forage crop

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and to keep the control of this resource in the hands of the Government, and out of the hands of the great industrial organizations which might exercise what Roosevelt termed "unregulated control of the means of production of these necessities of life." The present attack on this policy has as its objective the taking of this control away from the Government and putting it into the hands of the industrial organizations. The Society of American Foresters has a vital interest in the success or failure of this attack, because if successful why should not this new policy be applied to the timber lands within the National Forests? If we give annual crops of forage to the livestock industry for the mere cost of administering the lands, and if we permit unregulated use of the forage resource, why should we not also give to the lumber industry the unregulated use of our federal timber supply?

The present demands of the stockmen had their beginning in the question of the value of the grazing privilege on the National Forest lands. Early in 1920 the peak of agricultural inflation advanced prices on all forms of agricultural products, including pasturage, to the highest level in the history of this country, and created a value for private pasturage far beyond the rate charged in the National Forests. The House of Representatives Committee on Agriculture, believing that the Government is entitled to the same value received for similar use by private individuals, sought to bring about an increase in grazing fees which would equalize the discrepancy between the rates charged for private and federal pasturage. The Forest Service stood, from the beginning, in opposition to any drastic increases and took the stand that range values on privately owned land were then too far above the true economic level to be copied justly by the Government. The Forest Service pointed out the fact that it would be an act of bad faith to increase the rates during the life of the five-year permits which were then in effect on a considerable number of National Forests.

As a result of this stand the Service was allowed to make a very careful appraisal of the National Forest ranges to determine their fair commercial value, and to iron out unequal differences in value of different ranges in a way which could not be done under the flat rate system then in effect. When this appraisal was completed, and its accuracy was practically unquestioned by the stockmen, it was found that the present grazing fees would have to be raised generally from 60 to 70 per cent if the federal rates were made equal to what the stockmen were then willing to pay for similar use of privately owned land.

When all the facts were placed before the stockmen and they became aware that if the Government were to receive a reasonable commercial value for the forage crops it would mean an increase in present grazing fees, they became alarmed and termed such a proposal as the last straw which would break the camel's back. A movement was then started in the press of the West and among the stockmen's organizations to combat any advance in grazing fees. It is this movement, finally resulting in an investigation by a special committee of the United States Senate, which has now developed into a proposal to take the control and regulation of grazing resources out of the hands of the Forest Service and place it where the stockmen are practically free from any responsibility except for that of willful damage. This is a most notable change of front from that presented in the past when the stockmen's associations frequently endorsed not only the administration of grazing lands by the Forest Service, but even urged federal control of the unappropriated and unreserved semi-arid lands. The American National Livestock Association resolution passed at Phoenix, Arizona, January 14 and 15, 1913, is an excellent example of this former attitude held when the Federal Government was not getting full value receivable.

The new attitude was clearly stated in the resolutions adopted by the joint meeting of the stockmen at Salt Lake City last August. Through the daily press and by Colonel Greeley's article in a recent issue of the Saturday Evening Post, both sides of the question have been laid before the country. The chief of the Forest Service minced no words in his answer to the stockmen's demands. He pointed out the fundamental nature of this attack, the value of the prize at stake, and the effect on the small owners of livestock if these demands are satisfied.

However these demands may be threshed, when the chaff is blown away, it is decidedly evident that the privileges sought by law virtually will place 88,000,000 acres of forage-producing lands, much of which also produces valuable timber, forever in the hands of a few powerful stockmen or dealers in this new form of invisible real estate. It is also evident that those who are now enjoying grazing privileges on the National Forests are the favored few who will receive this wondrous gift, and that those who are not at present entitled to participate, but may wish to later on, will be recognized only according to ability to pay the price placed upon the privilege by the fortunate few.

Under such ostensible ownership by the stockmen, of land never

purchased by them, these perpetual rights will gradually filter into the hands of a few powerful sheep and cattle interests as surely as the sand filters through the hour glass. And the use of these broad acres most assuredly will then be subservient to cows and sheep. Trees to produce lumber for homes, and wood for fuel, will receive not equal consideration but far less than the grass. The water supply coming from these areas, so necessary for the economic development of the agricultural resources of the West, and so vital to many cities and towns as a supply for drinking and domestic purposes, will be secondary or unconsidered compared to the demands of the stockmen. Recreation on these areas will be dealt with accordingly, regardless of the wishes and even the requirements of Boy Scouts, Girl Scouts, Camp Fire Girls and the public at large. Wild life—elk, deer, mountain sheep, mountain goats, ground nesting birds—public hunting and fishing, all will be affected. Will the stockman consider these other interests against his own as fairly as they should be considered? Most assuredly he will not.

Although a great deal more might be said in defense of our present national policy of conservation and wisest use of grazing lands, it seems that sufficient arguments have been developed which leave no doubt as to how the present policy would be affected if the demands of the stockmen are granted. In justice to a large number, perhaps a majority, of the 31,000 grazing users of National Forest range, it may be said that all the stockmen do not fully subscribe to the demands of those in control of the stockmen's associations. Furthermore, in justice even to those who have sponsored these demands, let it be said that without doubt the chaotic conditions, from which the livestock industry in the West is just emerging, have left many of the participants more or less in a state of delirium, which may account to some extent for their unthinkable position.

Grazing has an important place in the national conservation program as applied to the National Forests, and the recent demands by the stockmen should be viewed in the light of that place in the program. As I see it the forage resources on the National Forests should contribute to the welfare of our country somewhat as follows:

1. The grazing resources in the National Forests should be made to play their full pro rata share in the upbuilding of a stable and productive livestock industry.

2. Grazing use should be based upon as complete utilization of the forage resources as is consistent with forest production, water-shed



protection, permanency of forage production, game propagation and recreation.

3. Grazing use should be authorized by law where, in the judgment of the Secretary of Agriculture, such use is not injurious to the primary purposes of forest production and watershed protection, for which the National Forests were established. Also where the grazing of domestic livestock is not inconsistent with other commercial and lawful uses or with recreation and wild life.

4. The price of grazing uses should be based upon a fair compensation for public resources converted to private use, which would mean values based upon reasonable commercial principles.

By the very nature of the demands of the stockmen, by the fact that numerous newspaper editorials from within the region most affected oppose these demands, and by the inherent interest of all foresters in all policies of conservation, it becomes the duty of the Society of American Foresters to investigate these demands and to present to the people of the United States an opinion thereon. As a member of the Northern Rocky Mountain Section of the Society of American Foresters, speaking with a knowledge based on long experience in dealing with the problems of the forage resources in Montana and northern Idaho, I feel that the Society of Foresters can strongly endorse Secretary Jardine and Colonel Greeley's opposition to the full demands of the stockmen's associations. The Society is in a position to assist the people of the United States in maintaining full control of the forage resources on federal lands, and to see to it that the people receive a just value for the sale of such products.

Endorsed by a special committee representing the Northern Rocky Mountain Section of the Society of American Foresters.

## FOREST GRAZING RIGHTS IN EUROPE—SOME DEADLY PARALLELS

BY P. L. BUTTRICK

*Secretary, Connecticut Forestry Association*

In view of the demands of our western stockmen, as set forth in the September issue of the *American Wool Grower*, for property rights to graze stock on our National Forests and Public Domain, it is well for us to look to the accumulated experience of Europe where such "rights" have been in force for centuries. The public interest has suffered from them in three distinct ways: first, under their cover, large areas of forest, both public and private, have been needlessly destroyed or rendered only partially productive; second, they have held back the progress of agriculture by perpetuating uneconomical stock-raising methods; and third, they have been the cause of an enormous amount of wasteful litigation and ill-feeling. Despite a struggle going back to the early days of forestry, neither complete control, much less eradication of such "rights" is yet complete, nor, despite the earnest efforts of forest administrations, likely soon to be. Furthermore, the "rights" which our stockmen demand, generally speaking, exceed in scope those prevailing in Europe.

We intend here to study them in a generalized way, giving briefly their origins, their legal character, and the nature of the steps taken to control and eradicate them, confining our attention to England, France and Germany, since somewhat contrasting methods have been used, although rights of a similar nature have prevailed in other countries. Their effects upon the forest, together with the general history of grazing in various European countries, is being discussed in a series of articles in *American Forests* and *Forest Life*, and more briefly in a memorandum attached to the report of the Special Grazing Committee of the Society of American Foresters headed by Prof. H. H. Chapman. In a subject as far-reaching and complicated as this there are certain to be minor inconsistencies to every major statement, but it is believed no fundamental errors have been made. Mrs. Carl G. Barth of New Haven, who comes of a family of Norwegian foresters, has assisted with the German literature.

There is large literature regarding them. It concerns their origin, their legal status and their relation to forest management. It is not





as well as for the purposes of this  
and together.

at roots in the old communal land hold-  
the later complicated system of feudal

Those which grew up under the early  
without definite grant, but were later  
of immemorial usage. Those originating  
granted either by public officials for public  
usually the feudal lords, on their own,  
or even. Sometimes these grants were  
with the passage of the years, became

action, or *prescription* as the legal term  
holders being entitled to all the wood  
all the stock they wished, in both cases  
the forest. Those conferred by definite  
were more apt to be for a definite  
crete amount of wood.

#### THE HOLDERS AND THE PUBLIC

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went on, and the reverse condition ob-  
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owners and the public to abolish, or at  
able bounds, in order to save the forest  
of their own property; and, on the  
part of the right-holders to extend and  
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and to a lesser extent England, have,  
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not so much in the laws or their

enforcement as in the inherent nature of the rights themselves and the point of view which the right-holder is, by virtue of being a right-holder, bound to have.

It is difficult to see how these same conditions could fail to obtain in our own forests if the same sort of rights are set up.

#### CONTRASTING METHODS OF CONTROL

It is interesting to compare the legal methods used by the different countries in dealing with rights.

In Germany, the principle is legally recognized that forest rights with very minor exceptions are damaging to the public interest and should be eradicated wherever possible. (Daukelmann, p. 124, Vol. I and p. 448, Vol. II.) Some of the methods which may be used for their eradication would practically amount to confiscation under Anglo-Saxon or French systems of law.

In France the attempts at control have largely taken the form of general legislation based on technical forestry knowledge, court decisions being largely explanatory ones based on statute law. Rights can, generally speaking, be extinguished only by purchase, but the state may do this under its power of eminent domain.

In England, lacking until the last few years a well organized technical forest service, restriction has apparently largely taken the form of court decisions based upon questions of equity as between right-holders. The courts do not seem to have been particularly concerned with protecting the forest. Such legislation as has been passed in England has mostly been in the form of "Enclosure Acts" under which the "Lords of the manor," in whom for legal purposes title to public lands was assumed to reside, usually the most important right-holders, obtained complete personal title to the public lands and thus excluded the smaller right-holders. The earliest of the enclosure acts, known as the Statute of Merton, was passed in 1236. Actions under these Enclosure Acts have frequently been arbitrary and public opinion has apparently caused them to become practically dead letters, thus leaving the small right-holders in possession of the field and free to destroy the remaining forest and further deplete the scanty pasturage.

It is quite evident that the English system is the least successful of the three.

## LEGAL NATURE OF FOREST RIGHTS

Forest rights are a form of property, not a sort of indeterminate privilege. As property they fall into two legal categories, being either *personal* or *real*—real in the sense of real estate.

A *personal right* is the right of one person to graze or make use of part of the products of a forest not his own. This right extends to him irrespective of his residence, and was usually conferred by definite grant but was apparently untransferable and usually terminated with the death of the holder (Guyot, p. 124, Vol. II). Personal rights have now practically become extinct, being largely unlimited, they have fallen under the ban alike of the courts and legislative enactments and seem to have been rare even at the time when rights were growing up. In England where they are known as rights *en gros* (Williams, p. 184), there seem to be traces of their continued existence, but apparently in both France and Germany they have been outlawed by various means. (Baden-Powell, p. 83, Williams, p. 93, Michel and Lelong, Vol. I, p. 118.)

A *real right* is a right appertaining to two pieces of property, to one of which the right adheres and upon the other of which it is exercised. For example, the owner of a certain farm whoever he may be at the moment, has the right to use wood or pasture cattle, for the *use on his own farm* on a certain forest, whoever be its owner at the time. In other words, the right pertains to the property and not to its owner. In legal terms the property to which the right adheres is known as the *dominant estate*, that wherein the right is exercised is known as the *servient estate*. In the light of forest history these terms fully live up to their rather ominous sounds.

Evidently the rights demanded by the western stockmen lack the property limitations of *real rights* and the time limitations of *personal rights*, and would in consequence be doubly vicious. It would almost seem that the stockmen must have spent some time studying the European system, and devised one which, from their point of view, would improve upon it.

## TRANSFERABILITY OF RIGHTS

Real rights although at an early date they had little if any limitation as to the amount of stock which could be grazed or of wood taken, were apparently always limited as to their transferability. The owner could not sell his right independently of his property, nor conversely



could the owner of the forest purchase it without purchasing the property to which it was attached. If the property was rented the right pertained to the occupier not to the absentee owner, one could not be rented apart from the other (Cooke, p. 11). In case the right-holder sold part of his property, the new owner possessed only a proportionate share of the original right.

Obviously rights of this kind could not fall to absentee ownership, as could those proposed by our western stockmen. The local right-holders, while they were more interested in extending their rights than in preserving the forest, were certain also to suffer greater injury from its destruction than would non-residents. The grazing "rights" proposed by our western stockmen could easily fall into non-resident ownership, nothing would prevent their all being owned in New York, or Russia for that matter. No effort of the imagination is necessary to realize how little absentee owners would be interested in preserving the forest, particularly when their own interests would seem to profit by its destruction.

#### DIFFICULTY OF EXTINGUISHING RIGHTS

No matter how great a drain on the forests these rights become, in the absence of special legislation, land owners whether public or private, could extinguish them only by purchasing the land holdings of the right-holders. As this would frequently have meant the purchase of entire villages or farms, it frequently meant that the owners gave up the struggle and practically abandoned control of their property.

In the case of public forests, extinction, once the rights had become legally recognized, was impossible by legislation or executive action under a democratic form of government. Being a form of property, their arbitrary extinction would amount to confiscation. Consequently, in France, legal provision was finally made, by which with certain exceptions their purchase by agreement or under condemnation proceedings irrespective of the land which the right-holder owned is possible, (Article 64, Code Forestiere). Apparently this form of extinction does not exist in England, but does in Germany (Danckelmann, p. 123). (See also page 144.

It takes no prophet to foresee the difficulties sure to face our government in extinguishing grazing rights if once legally created.

## ABUSE OF A RIGHT NOT A REASON FOR ITS EXTINGUISHMENT

If a grazing or free-use permit is issued under present conditions by the forest officers on one of our National Forests it presumably contains a clause empowering the forest officers to revoke it for non-compliance with its conditions or for damage to the forest. A forest right, once legally established, however, cannot be extinguished because it has been abused and the forest damaged (Guyot, p. 176). Since it is a form of property it can no more be taken from an owner because he abuses it than the property of a man can be confiscated because he maintains a gambling den upon it in defiance of the law. The only recourse for the owner or forest administration in case the forest has been damaged is through action in the courts. This may result in financial compensation, but does not restore the forest, which in the case of public forests, at least, is more important than obtaining compensation for its destruction. It is difficult to see how it could be any different in this country if the "rights" asked of Congress by the stockmen should be granted.

## AUTOMATIC EXTINCTION OF RIGHTS BY NON-USE

It sometimes happens that a right-holder will neglect for many years to make use of his right and then perhaps wish to use it to annoy the land owner or embarrass the forest administration at a critical moment. To meet his situation the French Government passed a sort of statute of limitations under which they are declared to have lapsed after thirty years of non-use (Guyot, p. 315). In England even this rather lenient provision seems to be lacking, court decisions as to whether a right expires for non-use being conflicting (Cooke, p. 60).

## RIGHT OF PROPERTY HOLDERS TO PUT PROPERTY TO OTHER USES

In this connection it must be borne in mind that a right-holder is, in the eyes of the law, not merely the possessor of a sort of perpetual free-use permit, he is the owner of as much forage or wood as his right calls for, just as the owner of mineral rights is legally in possession of the minerals, the owner of the surface being bound to respect his right to remove them and can not obstruct him in so doing.

Legally the land owner must furnish the forage or the wood called for under the right and may not do anything which tends to destroy the grass or the wood *which is not his but belongs to the right-holders*. While the right-holders have never been able to prevent the entire con-

version of a property from grazing or forest to industrial or residential uses, many attempts have been made by them to do so. In rare instances the holders of wood-rights have insisted before the courts that owners manage their property in such a way as to keep the forest productive, so as not to defraud them of their property (Baden-Powell, p. 293). In far more cases holders of grazing rights have, through the sanction of the courts, prevented the owners, both public and private, from reforesting since the growth of the grass, which belonged not to the land owners but to the right-holders would be adversely affected (Cooke, p. 65).

In Germany, despite the legal recognition that no servitude can be hostile to proper use of the land, it has been written into the law that owner may not change the form of forest management in such manner as to decrease pasturage, such as by a change from hardwoods to conifers for instance, or he may not plant up natural blanks in the forest, as that would decrease grass growth (Eding, p. 92).

In England if it can be shown that the right-holders will have enough grass even if part of the area is planted they can sometimes obtain legal permission to do so (Cooke, p. 65), but in practice this is impossible of application (Forbes, *Afforestation of Commons*, *Quarterly Journal of Forestry*, 1924, p. 50).

In France the grazing interests have repeatedly, by political influence, blocked attempts of the forest service to reforest public lands. (An article on this subject is in preparation.)

Since like causes produce like effects it is difficult to see how, if Congress establishes grazing property rights on our National Forests, they could avoid having the same legal nature as those in Europe and give rise to the same limitations to the power of Uncle Sam to manage his own forests and public domain that they have to European governments.

ORIGINALLY RIGHTS WERE ON AN "AREA BASIS"—ANALOGY WITH THOSE  
ASKED BY OUR STOCKMEN

Demand Number I of the stockmen as set forth in the September issue of the "National Wool Grower" specified that the rights should be on an "area basis." This means, if it means anything, either that the right would be limited only by the boundary of the forest upon which it applied, or that the amount of stock which could be grazed on a given area would be unlimited in number. Either interpretation would be



dangerous to the welfare of the forest and could legally be stretched to sow seeds for the ultimate destruction not only of the trees, but also the range, as can be seen from European experience.

\* In the dim past pasturage rights were unlimited both as area wherein they applied or as to the amount of stock which could be grazed. Nearly two hundred years before Columbus discovered America it was realized in France that such unlimited rights gave right-holders the legal power to let their stock destroy the whole forest if they were so minded.

Fortunately, for the forest, it was not so necessary in those days that everything be done according to the forms of law as now, and we find French royal edicts restricting the area over which grazing could be carried on on public forests by right-holders. The first of these laws was issued in 1318 (Hoffel, p. 138, Vol. I). Somewhat later a more limited power was given to legally accomplish this in England by "statutes of enclosures," which allowed owners and forest officers to exclude stock after cutting till reproduction could become established and reach an age where it would supposedly be immune from damage. Previous to this it had been more or less arbitrarily carried out on the royal forest by the kings.

Later in France it became evident that excessive grazing could destroy the forest piece-meal so long as an unlimited amount of stock could be placed upon it even when the forest officers had authority to specify the places it could be grazed. So in 1669 it was decreed that the forest officers had authority to limit the amount of stock to a point not to tax the yield capacity of the forest (Article 5, Chapter 19, *Ordonnance de 1669*).

In England it is established in common law that no right-holder may place enough stock upon a forest or pasture to exclude the stock of others, regardless of "priority." As Cooke (p. 65) expresses it—"It is contrary to the very essence of a right to turn out such an unlimited number of cattle by which the whole of the herbage might be consumed.

\* \* \* Such a user the law considers not as a right, but as a wrong." He goes on to say that one could no more acquire by prescription such a right than they could a right to clip the Queen's coin.

Since, however, it is the court that determined the relative rights of each right-holder, it usually becomes a question of equity between them rather than one of a consideration of the welfare of the forest or

the grazing ground, and in the long run, appeals to the courts, if allowed in this country, as desired by the stockmen, would tend in the same direction. This statement is no reflection on the courts, but is inherent in the very nature of things.

#### RIGHTS NOT FOR COMMERCIAL USE

In practice in all three countries, Germany, France and England, except in the case of the public grazing grounds in France, the accepted principle is that a man can only graze the amount of stock which he can maintain over winter or at ordinary times on his own land. This is to prevent commercial use of rights, which would necessarily mean their abuse. Apparently, it was the original intention even on the public grazing lands in the mountains of France. But in the face of an organized grazing industry the old regulations have broken down.

As far as public grazing lands are concerned, and there are considerable areas in both countries, neither the French nor the English governments have ever been able to assert authority to control grazing upon them and they are still either persistently overgrazed or entirely unregulated. The same is true in the Austrian Alps.

#### PROGRESSIVE LOSS OF PUBLIC COMPENSATION FOR RIGHTS

According to Huffer (p. 238, Vol. I) those forest rights which originated by definite grant usually involved a payment for the right. The payments were nearly always nominal, but were at first insisted upon to show that the grazing or wood usage was a privilege accorded and not a right exacted. Sometimes these payments were in the form of single sums once for all, sometimes an annual one. Sometimes payments were in personal service, sometimes in goods or produce.

As time went on the annual payments were apt to be forgotten as being too small to be worth collecting. Later if attempts were made to collect them, the Forest Service or the land owners found themselves unable to do so in the face of the opposition of the right-holder. At length they were either legally outlawed or completely forgotten.

In either case the owners or the forest officers discovered that not only were they unable to receive compensation for the loss of their forage or wood, *but that they had in addition parted with legal title to it.*

Is it not conceivable that remission of grazing fees if made legal on our western lands might end in the same way?

In France early in the 19th century it came very near being declared on the basis of legal studies that by immemorial usage right-holders had actually become co-owners of the soil of the forest (Guyot, p. 212). If this interpretation had prevailed it would have broken up their National Forests. It is conceivable that if grazing rights should be legally recognized on our National Forests the same claim might later be raised here.

#### RIGHTS BELONGING TO ENTIRE COMMUNITIES

It frequently happened, particularly in France, that rights were granted or grew up in favor of all the inhabitants of a village (Michel and Lelong, p. 183).

Rights of this kind were perhaps the most dangerous of all, since with the increase in population, the drain upon the forest automatically increased in proportion and if not checked could not help ending in its destruction.

In the face of this condition, the Forest Service had to either surrender the forest, reduce the rights of each holder to a point where they were of little or no value, something to which the inhabitants were bound to object strenuously, and often successfully, or call on the law to prevent new rights from being created for new inhabitants. In the latter case, which seems to have been generally adopted, a privileged class arose in the village which profited from having descended from right-holders or from having purchased property to which rights adhered, and had use of public resources to which their co-citizens by reasons of migration to the village at a later date, were denied. The unfairness of the arrangement from any point of view scarcely needs to be discussed.

If "rights based on established priority" are legally granted to our stockmen of today, one can scarcely envy the officers administering our National Forests of fifty or even twenty-five years hence, when, to preserve the remnants of the timber and forage on the forests, they are obliged to take what will certainly be considered an arbitrary and undemocratic course in opposing the creation of new rights to meet the demands of an increased population. Yet, if they are true to their professional duty, they will have to do so, and suffer the unpopularity so frequently accorded under similar circumstances to their French professional brethren.



"LEGAL RECOGNITION OF GRAZING ON THE NATIONAL FORESTS"

It may be doubted whether Congress will grant the full demands of the stockmen for "property rights," something against which the public has already shown its opposition. In fact, the bill introduced by Senator Stansfield (S. 2584) says nothing about them, but even a casual reading of its text shows that the "ten-year grazing contracts," which it talks about, are almost the same thing and would almost automatically become full property rights in the course of time. Furthermore, it seems obvious that any legislation establishing "legal recognition of grazing on the National Forests," is bound to serve as an entering wedge under cover of which such "rights" could creep in with the passage of the years, entirely unknown to the public and almost without the forest officers themselves being aware of it. It is doubtful if many men, even foresters, were aware of what was really taking place in Europe when they grew up there.

## STATE FORESTS IN RELATION TO THE NATIONAL FOREST PROGRAM \*

BY F. W. BESLEY

*State Forester of Maryland*

From the beginning of the forestry movement, the acquisition of lands for the purpose of creating state forests was a primary motive. When the state of New York, the first to organize a forestry department, enacted legislation creating it in 1885, provision was made for the acquisition of state forests, and soon thereafter, the actual purchase of land for the purpose was begun. This program has moved steadily forward, until now New York has nearly 2,000,000 acres in state forests, the largest acreage of any state. Pennsylvania, in 1895, established a forestry department and adopted a program providing for the purchase of forest land. The actual purchase was begun three years later, and now the state forests of Pennsylvania exceed 1,150,000 acres, and with plans for much larger acquisitions. The total area of state forests in the United States now approximate 8,000,000 acres, of which at least 4,000,000 is under the complete management of state forestry departments. There is an additional 4,000,000 acres, state owned, but outside of the state forests, strictly so called, including land owned by state institutions, municipalities, schools and other units. Nearly every state that has adopted forest laws has incorporated in its organic act a provision for the acquisition of forest lands. Twenty-three states now have state forests, and the acquisition policy is rapidly becoming universal among the states.

The importance that state forests play in the activities of the various forestry departments varies from that in New York, where it constitutes a large part of its activities, to the states having none, and, hence, lacking the opportunity. There is nothing that gives greater prestige, importance, and permanency to a forestry department than the ownership and management of extensive forests.

State forests have certain well-recognized values. With local timber surplus rapidly vanishing and the exaction of a heavy toll in freight for bringing lumber into the state, the necessity for each state building up, so far as possible, its own timber supply is emphasized more and

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\* Paper presented at the Annual Meeting of the Society of American Foresters, Madison, Wis., December 17, 1925.

more. It is not only a safeguard for the future, but a sound business investment that can be easily demonstrated. The example of Pennsylvania may be cited, which in the past 24 years, with an expenditure for land, administration, development and improvement of \$8,000,000, now has a property of a value in excess of \$13,000,000, in state forests, or a net gain on the investment of over \$5,000,000.

State forests help to stabilize and maintain wood-using industries. It is quite evident under the natural trend of industrial development that permanent wood-using industries will be developed in and around state forests, which can give the assurance of a continuous timber supply. Mr. Henry Hartner, standing in his 30-year old pine forest at Urania, Louisiana, a year ago, told the Association of State Foresters that every 1,000 board feet produced from his forest put \$60 in circulation. If this be true in the pine forests at Urania, it ought to mean \$100 per 1,000 under the more intensely specialized uses possible in the highly developed sections of the East and the middle West. It may not be possible to secure sufficiently large forest areas to stabilize the timber business in the eastern half of the United States, but it *should be possible* to secure sufficiently large areas to demonstrate the correct principles of forest management on a sufficient large scale to make them of practical value. This is a service that state forests can render in a most convincing way. Under more intensive management, it has been shown that fires can be almost entirely eliminated, timber growth under proper silvicultural systems tremendously accelerated, and the character and composition of the forest greatly improved. If they served no other purpose, they would be fully justified, but other uses often develop that give them supplemental values in addition to those of timber production. Such, for example, as pleasure forests and recreational grounds for the enjoyment of the people. Natural beauty and proximity to the large centers of population often give the state forests a higher value for this form of use than for any other. The Adirondack forests of New York serve the recreational use to a very high degree, but the same thing is more or less true, in practically all of the state forests, and has furnished a contact with the public that has been very helpful in furthering the forestry movement, through the support of campers and other recreationists.

Many of the state forests are located on important watersheds, serving the cities and towns, or protecting water-power developments.



This has given added value and brought other contacts that are very helpful, all without impairing their primary use for propagating a timber supply.

These areas also furnish a shelter and breeding place for game. In Pennsylvania and other states, areas within the state forests are set aside as game refuges, a use not inconsistent with timber growing. Hunting is excluded from these areas and the surplus game, spreading out into adjacent areas, helps to restock them, thereby maintaining the value of the hunting privilege. In the same way, fish are protected in certain restricted areas. This brings about the cooperation of the game departments in forest protection and enlists the support and cooperation of game associations and all those who enjoy hunting and fishing.

In most of the states, state parks and state forests are very closely coordinated, in many cases under the same management. This seems to be a logical method of procedure and one calculated to cause the least friction or duplication of effort. The state forestry departments realize that areas on state forests that are better adapted for park use can be set aside for this purpose and administered as such. The uses of these areas are determined largely by local needs and those who administer the state forests are generally responsive to such needs. It usually means simply the setting aside of areas of high scenic or recreational value for park use, and the development of other areas for timber production, and such areas can be administered much more economically under the forest administration than to have them set apart and administered separately under a park commission. There are other areas that are valuable only and exclusively for parks. Often these areas are in close proximity to cities and towns more directly interested, thereby becoming a local affair in which the city or town, itself, is chiefly interested, and should have control. In the case of more remote areas of special scenic value, which can not be properly classified as state forests, they might properly come under the administration of the forestry department, as such areas would not be intensively developed as in the case of the city parks, but their natural beauty preserved unspoiled.

There is a strong demand for state forests and if this can be satisfied by bringing about a combination of state forests and state parks, both will be materially advanced. On the other hand, if separate departments are set up with their competing and conflicting interests, which can not be satisfactorily reconciled, one or the other must be sac-

rified. The administration of the National Forests and of the state forests has demonstrated that foresters realize their responsibility in maintaining the forests as a public trust for the greatest good to the greatest number. They have not failed to realize that on specific areas the preservation of scenic values is more important and of greater benefit to the people, than the production of timber.

Since the state forestry movement is growing rapidly and the acquisition of state forests has become a definite policy of most of the states conducting forestry work, the relation of the state forests to the National Forests, as well as to state parks, municipal and town forests, should be clearly defined. The national government has taken the leadership in publicly owned forests. It was in the position to do so, from the fact that it owned vast areas of forest land in the West which could be erected in National Forests without the expenditure of public money. It was an act of good stewardship that land suitable for the purpose should be set aside as National Forests. They were best suited for this purpose than for any other, and as such would best serve the people of the entire country. Here again the principle of the highest protective use is demonstrated, and it has been a wise move on the part of those administering the National Forests that lands, originally included in the National Forests, but found better adapted for other uses, such as for agriculture, are being excluded. It has been stated by good authority and often repeated that not less than 20 per cent of the forested area should be publicly owned and placed under sustained yield management for public safety. As timber growing becomes more profitable and a larger proportion of private owners become enlisted in the practice of forestry, it may be less necessary to have large, publicly owned forests, but for a long time to come, public forests must be depended upon to produce enough timber to maintain a timber balance, especially of the larger size classes.

Under the Weeks Law, enacted in 1911, the Federal Government entered upon a new policy in regard to the acquisition of National Forests. A federal appropriation was made available for the purchase of National Forests in the Appalachian—White Mt. region. To date, about 2,400,000 acres have been acquired in 11 different states. In the beginning, the states in which lands were acquired for National Forests had not developed an acquisition policy of their own. They felt that public forests were desirable, and since the state was not able or willing to purchase the lands, the entry of the Federal Government was

welcome, rather than have no public forests. The states are earnestly endeavoring to build up strong forestry departments. It is recognized that state forests are a valuable asset in rendering stability and importance to the forestry departments. The states have gone a long way with their educational programs in studies and investigations, and in giving advice to the private land-owner as to the management of his forest land. It has been missionary work, well-directed, and much has been accomplished. But the missionary, if he is at all effective in a given field will, eventually, work himself out of a job, and state forestry departments, having no state forest lands to manage, are somewhat in the same position, as a theoretical farmer, owning no lands of his own, but attempting to tell his neighbors how to run their farms. The state forestry departments, particularly in the East, are seeking to acquire state forests. With the Federal Government in these states seeking to enlarge the existing National Forests, or to acquire new territory, an embarrassing situation has arisen in a few of the states, and is in danger of arising in others. Every reasonable effort is, no doubt, being made to avoid a conflict of interests. Competitive bidding for the same land would be suicidal. Unless "spheres of influence" are agreed upon, trouble is likely to ensue. The interest in state forests is increasing, and in the older settled states, where conditions are fairly well-stabilized, it is a serious question whether the Federal Government should attempt to acquire additional areas of National Forests. Had the National Forests of the West been dependent for their support upon the states in which they are located, most of them would have ceased to exist long since. The forestry departments of the Western states are finding it difficult to acquire state forests because of the existence of large areas of National Forests within their borders. Their attitude is that of "Let the Government do it." This may answer the timber requirements, but initiative and pride of possession on the part of the state is lost and the state forestry department curtailed to that extent. The Western states are not interested in the creation of National Forests in the East. The main reason for national vs. state acquisition is that if the extension of public forests were left to the state's initiative, action might be so long delayed and so inadequate, that valuable time and opportunity would be lost. At best, the Federal Government cannot hope to acquire sufficiently large forest areas in the East to affect, measurably, the national timber supply or stream flow. It is after all largely a local problem of greatest interest to the individ-



ual states concerned, and as the timber situation becomes more acute in the states, each will act to protect its interests by building up its forests to meet its needs.

There is an increasing sensitiveness on the part of many states over states' rights. Just now, there is a strong reaction setting in against the present encroachment and further extension of the authority of the Federal Government over the internal affairs of the various states, and it seems unwise to launch any extensive program in National Forest acquisition. In the creation of the National Forests, government land that already belonged to the public was properly set apart for a special use for which it was best suited, and as such is an asset, devoted to the service of all the people without disregarding its responsibilities to the local communities in the payment of part income—25 per cent—in lieu of taxes. The situation is different when money is taken from the public treasury to buy lands in sections where it seems likely that the states themselves can and will work out their forestry problems unaided by the Federal Government. As a leader of the forestry movement, the national government has accomplished much through federal initiative, not only in presenting convincing facts as to the timber supply and the need of united action, but also by encouraging the states, through subsidies, to organize for better forest protection. So long as it is the policy of the Federal Government to appropriate money for forestry purposes under the name of "cooperation," whether on a 50-50 basis or smaller proportion, each state will demand its share, whether it believes or does not believe in the principle involved, and so long as there is no unreasonable interference with state policies and practices. Great credit is due to the Forest Service, that in the administration of this subsidy, a minimum amount of interference with state control has been imposed.

## PUBLICLY OWNED FORESTS AND THEIR PLACE IN A COUNTRY-WIDE FORESTRY PROGRAM\*

BY J. S. HOLMES

*State Forester of North Carolina*

"The natural resources of the earth have in all ages and in all countries, for a time at least, been squandered by man with a wanton disregard of the future, and are still being squandered wherever absolute necessity has not yet forced a more careful utilization.

"This is natural, as long as the exploitation of these resources is left unrestricted in private hands; for private enterprise, private interest, knows only the immediate future—has only one aim in the use of these resources, namely, to obtain from them the greatest possible personal and present gain."

Does that sound familiar? It is the first two paragraphs of Fernow's *Economics of Forestry*.

We were all brought up on that axiom of Forestry and turned loose on an indifferent but indulgent public with that principle, if not foremost, at least settled well in the back of our minds. Then after a few years on National Forests where a rather rough and sometimes questionable policy of forestry is being practiced to a greater or less extent, we find ourselves in state or private positions and up against the hopeless problem of trying to get the private owner to practice forestry. And at the end of a life-time if we are lucky we may congratulate ourselves that we have so far succeeded that the minority of landowners have consented to let the federal and state governments protect their property from fire.

There is even now some difference of opinion amongst foresters as to whether the private owner can afford to invest in forest lands and grow timber, and probably the weight of opinion is against it. What is all this demand for tax revision by lumbermen and other large land owners? It is the investment which is the burden rather than the taxes. The more conservative of the private owners say they can get along with taxes as they are, but it is the fear of having them increased that keeps them from practicing forestry. After cutting off a crop which cost them nothing to grow, how can they justify spending good money for a

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crop of timber just as they would for a crop of apples or hay? Instead of costs being reduced they will no doubt be greatly increased, for already cut-over land is bringing more than land and timber together brought 15 or 20 years ago.

Farmers can not bear a raise in taxation sufficient to meet all the growing costs of county and state government. Their land is already valued too high for the crops to pay the carrying costs. Can they be expected to raise their own taxes in order to relieve the lumberman of his?

But in addition to investment and taxes, the woodland owner is now to be called on to pay 25 per cent of the cost of fire protection. Then when it comes to leaving seed trees, leaving and protecting young growth, growing and planting seedlings, it is only the specialist or the "impractical visionary" who will seriously attempt it.

How many private owners are now practicing forestry? I was asked that question recently about North Carolina and I answered, as truthfully as I was able, that outside of a small amount of fire protection work only one private owner, so far as I know, was doing anything at all in forestry.

The remedy is public ownership. Our farmers will be obliged to continue to own a considerable proportion of the forest land and grow, with more or less care, a proportion of the timber, for it is mixed so closely with their cultivated land. But a big proportion of the larger tracts, whether their chief use is for growing timber, or protecting the streams, the climate or the wild life, should be owned and operated by the public.

The demand for the products of the forest comes chiefly from the non-landowning public, namely, the residents of our towns and villages. It is right, therefore, that they should be taxed for growing the timber, and share the cost of maintaining protection or recreation areas.

I think we are on the wrong track in spending all our energy on private forests. Standing idly by and allowing Congress to dribble out a few thousand dollars, and supinely acquiescing in the public attitude that the state or municipality can not afford to own forests, is a betrayal of our trust.

Let us glance for a moment at the experience of some of the other countries, both old and new. Their forestry history is worth a little study.

"State ownership of forest areas," says Fernow, "which in the beginning of the century began to decrease under the influence and misapplication of Adam Smith's teaching and the doctrine of individual rights, urged to its extreme consequences after the French Revolution, is now on the increase. Thus France, during and after the Revolution, taking the lead in this dismemberment of the forest property, which the monarchy had maintained (then nearly 12 million acres), sold during the years 1791 to 1795 nearly one-half of the state forests, and continued to reduce the area until there remained in 1874 but one-fifth of the original holdings. Since then a reversal of the policy has been in practice, the area of state holdings is being increased." (*Economics of Forestry*, p. 275).

The same thing happened nearly all over Europe. In Germany, for instance, the proportions of the various classes of public and private ownership, Dr. Fernow tells us (*Economics of Forestry*, p. 307), "which existed in the beginning of the century experienced considerable changes by the sale of state forests, the sales being due partly to financial distress, and partly to a mistaken application of Adam Smith's theories, which supposed that free competition would lead to a better management and to the highest development of the forest industry as well as of other industries." This tendency, however, was checked when the fallacy of the theory became apparent and a reversal of the policy set in. "The present tendency is not only to maintain the state forests, but to extend their area by purchase, mostly of devastated or deforested areas, and by exchange for agricultural lands from the public domain. Thus, in Prussia, the increase of state forest area has been at the rate of 14,000 acres per year since 1867; during the decade 1891-1900, 170,000 acres of waste lands were added at the average cost of \$10 per acre, and the budget of 1900 contained \$800,000 for that purpose. Bavaria spent about \$6,000,000 in such purchases during the last 50 years." The present proportion of publicly owned forests in Germany now is about 53 per cent, of which one-third is communal and two-thirds state and national.

A similar movement in Austria-Hungary resulted in reducing the state domain by sales during the first half of the 19th century from 10 million acres to about three million acres. The reversal of this policy brought the state owned area back again to about 10 million acres.



At the present time the forests of Europe, taken as a whole, comprise some 700 million acres, 54 per cent of which are in public ownership. Private protection forests are usually under some kind of government control but only in exceptional cases is such control adequate.

But some may think it fairer to compare the United States with self-governing countries of the New World rather than the supposed decadent countries of Europe. We find here an even more advanced policy of public ownership, perhaps because it is easier to adopt an advanced policy than to reverse an old one. Canada retains 93 per cent of her 600 million acres of forest land in government ownership, 150 million of it being dedicated to permanent timber production and the remainder receiving an increasing amount of regulation. Of Australia's 90 million acres of forest, 80 per cent is owned by the various states of the commonwealth, one-quarter of which is forest reserves.

The island dominion of New Zealand, having an area about twice that of my own state of North Carolina and from time to time held up to us for purposes of comparison or argument, has 17 million acres of forest, 73 per cent of which is in public ownership. Three-fifths of this is in what are called dedicated forests, i. e., set apart for permanent public use and administered by the Forestry Department; while two-fifths are National Parks, Scenic Reserves and unalienated Crown lands. Yet, in spite of this large proportion of publicly owned and controlled land, acquisition goes merrily on. In the annual report of the Director of Forestry for the year ending March 31, 1925, he says: "The total area of state forests under the management of the Forest Service was increased by 52,409 acres during the year. The grand total acreage of nationally owned forests dedicated to timber-crop production is now 7,485,590 acres, compared with 4,144,076 acres in December, 1919—an increase of 80 per cent." The ratio of the area of state forests to the total area of the Dominion is now 11.3 per cent., compared with 6.2 per cent in the year 1919." His summary of what to us would seem such wonderful progress is interesting. "Only a very insignificant part of the foundation for the National Forestry policy has been laid—a policy which has for its goal the complete assurance of New Zealand's timber requirements; the conservation of all protection, climatic, and recreational forests; the preservation and control of our wild life; and a leadership in all Dominion-wide forestry interests concerned in the steady and prosperous development of our national life."

The ratio of the area of publicly owned forests to the total forest area of the U. S. is 4 per cent and if we were to increase in the next decade as fast as New Zealand is going we would have to acquire some 100 million acres of forest land by the various public agencies. Instead of that, for the past 20 years we have only increased our public holdings at the rate of about half a million acres a year. At this rate it would take us some 300 years to get the proportional results which New Zealand has achieved in the past six years.

The history of forest ownership in the United States is quite similar to that of Europe, the private distribution period as well as the reversal of that policy coming later, if we can dignify as such the period of the creation of National Forests in the West 30-40 years ago.

At the present time, according to Zon and Sparhawk, there are some 470 million acres of forest land in the United States, only 21 per cent of which is in public ownership and practically none of the private land, whether protection or production forest, is in any way controlled by government agencies.

Is it not time, in an era of unprecedented prosperity, to look to the future, instead of reducing taxes till there is no money in the national, state, county, or city treasury to buy land, no matter how good an investment it may be or how great will be the need for timber, stream protection or recreation in the future? Is there no leader in this country who dares to advocate spending the people's money for the permanent benefit of the people? Is tax reduction the only policy that a public leader can advocate and live?

So far I think the only reason for acquiring forest land countenanced by the Congress is for the protection of navigable streams. Congress has not recognized the protection of water powers or potable waters, or recreational or scenic areas or of fish and game or other wild life as valid reasons for interfering with what it feels might be the prerogative of other governmental agencies. As a matter of fact the federal government will not enter a state and acquire forest land without an express invitation from the Legislative Assembly of that state.

But I am getting dangerously near the parts of the subject assigned to my two colleagues—as the student debaters say.

Before yielding to the next man, however, I want to stress the increasing importance of our forests for other things besides the production of timber.

Protection forests are in every country recognized as the peculiar care of the state and most countries have felt that state ownership of forest lands on the headwaters of streams was the only effective preventive of erosion, silting, irregularity of flow and pollution. An extension of the term protection forests to most mountain forests and the acquisition of them by the public with strict methods of management would be a big step towards a permanent and constructive policy.

Although in our carefulness not to overstate our case most of us have steadfastly declined to recognize any effect of the forests upon climate, this also is undoubtedly an important function of mountain forests and should be taken into consideration in formulating a broad forest policy.

For the propagation, protection, and control of game, fish, and other wild life, the forest is an essential auxiliary. Game refuges and sanctuaries are being established by states and nation while the wealthy sportsmen are absorbing natural propagation areas into private shooting grounds. In former years private land was open to the sportsman wherever he went and game was hardly looked upon as the property of the landowners. Today private hunting preserves are gradually shutting out the sportsman of moderate means and a loud demand is heard for state or nationally owned shooting grounds. The Bulletin of the American Game Protective Association voices this demand editorially. "The Great American Public," it says, "must be taken into consideration and must share in the benefits of the refuges. This can only be accomplished by public ownership of shooting areas on which the rights and privileges of all citizens are equal."

Within the past few years recreation has assumed a place of enormous proportions in our national and social life. The present phenomenal invasion of Florida and its "back-wash" upon the Southern Appalachians is based upon the desire of the affluent to secure for themselves a full share of such of the country's natural resources as climate, scenery, soil and waters. The most beautiful, the most available, the most suitable areas for recreational purposes are rapidly being absorbed and either closed to the public or made a source of private gain. To allow the private monopolization of our varied and unique recreational areas because there is no insistent public demand for them at the present time is nothing short of criminal negligence on the part of our public men, in which category perhaps we must include not a few foresters.

But perhaps the largest field for public acquisition and operation is in the restoration to economic use of lands which the owners are finding unprofitable. The 81 million acres of non-productive forest lands now in this country must be rehabilitated, and probably the owner, whether corporation or individual, who has to regularly meet carrying expenses, can not afford to restore these lands to continuous production. Some few sporadic attempts are being made to reforest private tracts with the object of securing sustained yield and I trust they will succeed, but only time will show. Certainly most of these devastated forest lands will be a liability until some public agency takes them over and makes and keeps them productive. It is not contended that public ownership will necessarily be cheaper, but that it will be more effective, because it will keep in view the ideal of permanent public benefit instead of immediate private gain.

Whether the public agency acquiring and managing these land and forest resources for the permanent benefit of the whole people should be federal, state, county, municipal or community is a matter which the agencies themselves, and the public, will have to decide; but it is not necessary to decide every question connected with the subject before a beginning is made. Full responsibility should be accepted and far reaching action taken by each one of the existing public agencies without further delay.



## PRIVATE FORESTRY\*

BY DAVID T. MASON

*Consulting Forester, Portland, Oregon*

In a fifteen minute paper on the subject of private forestry it is practicable to deal only in broad generalizations, touching without attempts at qualification the points which appear more important to the writer.

For the purposes of this paper, private forestry in the United States may be roughly divided into three periods. For a few years before 1905, principally through the activities of the Bureau of Forestry, a few private owners became mildly curious as to the possibilities of forestry on their properties. The working plans made by the Bureau usually were not put into effect.

From 1905 to 1919 the foresters of the country were dealing mainly with various matters pertaining to the National Forests. Such attention as was given to the private owner resulted in the point of view that private property should, after the cutting of the old growth, pass into the ownership of the government, federal or state. Private owners themselves took more interest in forestry than in the previous period, partly in response to the economic problem involved, and partly through growing public sentiment that something should be done to reforest the cut-over lands. The private owner, wanting to be rid of the problem as simply as possible, also came quite readily to the attitude that he should cut the old growth timber from his lands and then sell them to the government for future management. Thus it became practically axiomatic among foresters and lumbermen that "forestry is a public function."

In 1919 it had become apparent that something really must be done with regard to private cut-over lands. A number of leading foresters then advanced the "mandatory forestry" idea. This movement had the effect of focusing sharply on private forestry the attention of both forest owners and foresters. While perhaps a majority of foresters at first approved the mandatory program, a number were convinced that a milder program, along what might be called "cooperative" lines would accomplish greater results in the long run. Investigations by committees of the U. S. Chamber of Commerce and the Senate paved

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the way for the enactment of the McNary law, which is along "cooperative" lines.

In the meantime, beginning about 1920, a few private owners broke away from the "forestry a public function" idea, and after some study, adopted for themselves a policy of permanent forest management. These private owners were located mainly in the redwood region of the West, and in the southern pine region. Year by year other private owners have begun seriously to study their own properties; some have already adopted a permanent management program, and numerous others are on the way. The procession is moving. One does not hear so much now the exploded fallacy "forestry is a public function."

What were the principal causes of the change of attitude of the private owners who adopted a reforestation program? First of all, economic conditions had greatly changed in the forest industries, giving a sound basis for the decision that, after all, under reasonably favorable conditions, tree growing could be carried on successfully as a private business. Second, the "public relations" angle was found, upon study, to be of great importance, going much beyond the matter of mere public opinion. Third, the adoption of a reforestation policy in a considerable number of cases at least resulted largely from the work of "forestry missionaries," who had gained the confidence of the owners and had shown them convincingly that under the conditions existing on their own particular properties, economic conditions and relations with the public were full justification for adopting a permanent forest management program. This missionary work has gone on quietly with the profession little realizing its existence or its importance. It is mentioned here to point out a channel through which much may be accomplished in the future.

We agree, of course, that the United States will need much timber in the future, which it must grow mostly within its own borders, and that if we are to have anything like as much as we shall want, there must be prompt action on a grand scale to prevent serious shortage. This means prompt action on lands owned both publicly and privately, especially on privately owned lands. A moderate amount of careful study convinces most people that it is quite impracticable and highly undesirable that an extremely large share of the privately owned forest land pass into public ownership. It is the firm conviction of the writer that the future timber supply of the United States must and will come mostly from privately owned lands. If, then, the private owner is

the most important factor in securing a future supply of timber, American foresters can render important service by bringing private owners willingly to the practice of forestry. Voluntary action will produce more timber than will mandatory procedure.

How can private action along this line be best encouraged and stimulated? There is rather general agreement that, for the successful practice of forestry on private lands, there is needed more effective forest protection, sound tax laws and thorough research to secure the facts as to rate of growth, yield, best methods of reproducing the forest, etc. To these three it is the desire, in this paper, to add another highly important factor to point out the need for more "missionaries." We need more men of sound judgment and ripe experience in forestry who are able to gain the confidence of important forest owners, to show them after careful study the forestry possibilities of the individual property in a way which will convince the favorably situated owner that forestry is a sound business. We need more men of these qualifications energetically working to interest and convert the private owner. And the work of the missionaries can be greatly strengthened by the support of the profession.

How can American foresters generally help in interesting private owners to the point of adopting sound forest policies? To an important extent, at least, this can be brought about by a change in attitude on the part of a substantial number at least of the members of the profession. Too widely there has been failure to recognize certain important facts.

Many have failed to recognize the sincerity of private owners who have, in good faith, adopted a program of permanent forest management. This skeptical attitude to some extent perhaps is not surprising, but it is hindering the progress of private forestry.

There is too much failure to recognize that our own profession amounts to something. One hears, even from prominent foresters, that "forestry is 90 per cent fire protection," or "forestry is nothing but common sense," or "any intelligent woodsman with a few simple suggestions, can do it," or "just read up on a few government bulletins." If forestry is really as simple as these expressions would indicate, there is little need for Forest Schools, and later experience in forestry work is of slight value. To give private owners such impressions as these is about as helpful as telling a sick man, who suspects that he has tuberculosis or heart disease, that all that is necessary is to buy a medical book or two, read up a bit, and then apply his own good common sense.

There is failure to recognize that extensive government forestry (more or less forced by governmental "economy") is not necessarily best adapted for private owners, who often can and should manage their own properties intensively.

There is failure to recognize that the private forester—the forest missionary—is actually able to render a reasonably valuable service. The man who starts in this sort of private work is sometimes told in so many words that he "may possibly catch a few suckers simple enough to put him on their pay roll," but that there really is no service of value which he can render.

There is failure to recognize that each private forest property is an intricate problem by itself. It is not sufficient merely to make a few sorts of maps and to prescribe a general formula. The forestry advisor must not only deal with the technical problems involved, but also the problems created by the general plans and financial situation of the owner, the owner's whims, if you like, and above all, he must have the confidence of the owner in a high degree. For success in the long run private forestry (and government forestry as well) must have a thoroughly sound economic basis.

There would be a great deal more private forestry in practice today if American foresters had had greater confidence that forestry really is a sound business under proper conditions. Private forestry will be practiced on a huge scale in the future, and the more firmly our profession believes in it, the faster it will come.



## COMMENTS

By C. S. CHAPMAN

*Forester, Weyerhaeuser Timber Company*

Major Mason's papers appeals to me as sound and practical as would be expected. About the only place where I wouldn't entirely agree with him is in relation to the part the public must play in the whole program. Where he refers to the exploded fallacy "Forestry is a public function" he doubtless refers to public ownership to the exclusion of any other form. This statement might, however, be misunderstood in some quarters. To my mind there is still need for expansion of public ownership. In other words it is my feeling that our states particularly must, in connection with individual owners, do far more than in the past. Just what the final adjustment as between federal, state and private ownership will be, none of us can accurately predict but it will work out as economic conditions dictate and be a pretty satisfactory arrangement. All agencies must push ahead as fast as conditions permit and it seems to me there should be hearty encouragement on the part of foresters, to the progress of any one and all of them.

To a large extent the public must make forest growing a financial possibility and this thought must be kept before the public.

One other matter in a way pertinent is the method of appealing to the public for greater aid along forestry lines. Most of us, I suppose, have no particular fear of a lumber shortage viewed from the standpoint of being unable to secure this commodity for purposes where it is the only usable material. But our lumber producing regions may well fear a shortage to the degree that payrolls and industries will vanish and communities disband. And this is something too, which the man on the street can understand. It strikes me as a desirable thought to keep before the people of our various states.

I fully agree with Major Mason that we should not be too critical of the particular brand of forestry any individual concern may practice. If there is desire to do anything which gives hope of a future crop on the area it is at least encouraging. And I agree with him too, that foresters must have greater faith in the business of forest growing.

## GUNNAR SCHOTTE

BY HENRIK HASSELMAN

*Acting Director, Swedish Forest Experiment Station*

One fine morning towards the end of the summer, on Friday, August 28th, Professor Gunnar Schotte ended his restlessly active life. Under a glorious sun and with a large attendance of friends coming from different parts of Sweden and from neighboring countries, his mortal remains were committed to their last resting-place at Lidingö Church on September 2nd. It was in his 52nd year that Gunnar Schotte was fated to make his last journey. Behind him he had a useful life filled with strenuous work.



GUNNAR SCHOTTE

Gunnar Schotte was born on the 9th of March, 1874, at Nyköping, where his father, Gustaf Viktor Schotte, was the headmaster of the Higher State secondary school. His mother, Minna Hollgren, is still alive. Gunnar Schotte's greatest interest in his schooldays was to collect plants; he was a great and eager collector, who thanks to journeys in various parts of the country and by a well managed exchange of specimens soon acquired an exceptionally large and comprehensive herbarium. With this collecting interest he combined a real love of nature, above all of the vegetable world, and a keen eye for variations in

plants. It would seem that his botanical interests, together with his relations among members of the Forestry Service, determined his choice of a career. After matriculating at Stockholm he entered the High School of Forestry, the course of which he completed in the years 1895-1897. Having finished the practical work required for employment in the public service, he was appointed assistant forester and was stationed in the Halland forestry district. One of the most important objects of forestry in those regions is to convert bare heaths into forest land. This task soon filled the young forester with enthusiasm. In order to widen and deepen his knowledge in this department he undertook a journey to study the heaths of Denmark, and afterwards sought to utilize the experience thereby gained. He then subjected the Halland heaths to a close study, distinguishing various types in respect of vegetation, the quality of the heath-peat (row-humus) and the suitability of the soil for growing different kinds of trees. These studies attracted attention to him, and when in 1902 the Institute of Experimental Forestry, later called the State Institute of Experimental Forestry, was founded, he was appointed assistant at this establishment. This appointment determined the rest of his life.

About the same time that this Institute was established, the Society for Forestry, soon afterwards termed the Swedish Forestry Association, was founded. When the scheme of this Association was first being discussed, it was intended that it should only comprise state foresters, but thanks to the intervention of far-seeing men, such as Mr. J. af Zellén, assistant undersecretary, and Count Fredrik Wachtmeister, the rules were formulated so as to allow all who took an interest in forestry and forestry questions to join the Association. Thus was laid the foundation of the great influence that the Swedish Forestry Association has exercised and still exercises on the development of Swedish forestry interests. Gunnar Schotte became the secretary and treasurer of the new Association, and the editor of its publications, and his name is inseparably associated with the development of these two institutions, the State Institute of Experimental Forestry and the Swedish Forestry Association, both founded at the beginning of the new century and both having exercised a vast influence on the development of forestry in this country. Gunnar Schotte's most important contribution is perhaps to be found in his work for the development of the said Association.

He was the born organizer and administrator, had an extraordinary power of work, found pleasure in purely practical work, and under-

stood perfectly how to collaborate with people of varying bent, temper and interests. All these qualities stood him in good stead as the secretary of the young Association. Even if many other persons, favorable circumstances, etc., have played their great rôle for the splendid success of the Association—it numbers among its members practically all whose interest is connected with Swedish forestry, in all close upon 4,000 persons—yet the credit of this, no doubt, is mainly due to Gunnar Schotte. Under his energetic, wide-awake, and vigilant management the publications of the Association developed splendidly. The leading organ of the Association, the Journal of the Swedish Forestry Association, soon became one of the foremost forestry periodicals in existence. Excellent get-up, varying and solid contents have gained it many friends and have earned for Swedish culture the handsome compliment that many foreign foresters, especially on the other side of the Atlantic, have learned Swedish to be able to benefit from the contents of the journal. But Gunnar Schotte knew not only how to secure good and valuable articles for his journal, he also possessed the rare knack of getting the parts out in time. When Christmas was coming round and it was a question of getting the last part printed, the table of contents compiled before the holy-days, he would work nearly all the 24 hours of the day. When the printing-office opened in the morning, he was there, prompting and encouraging, and it never happened that he did not get his parts or volumes ready. With a view to spreading interest in, and knowledge of, forests and forestry in ever widening circles, the Association started publishing a series of popular leaflets. Schotte became the editor of these publications as well. Thirty-two different booklets were published; they have, as a rule, gained great recognition and become highly appreciated. Each leaflet deals with a separate, well defined subject. From 1914 inclusive, these leaflets were replaced by the popular periodical "Skogen." It is an impressive series of publications dealing with forests and forestry that the Forestry Association has published under Schotte's auspices. Behind all the magnificent, beautifully illustrated volumes there lies a good deal of skillful, purposeful and clear-sighted editorial work, which would do credit to any writer.

The publishing of periodicals and other literature on forestry is, however, only one side of the activity of the Association. Of no less importance are its meetings and especially its excursions which bring together lovers of forestry from various parts of the country for the



purpose of discussing in common, either indoors or out in the forests, questions bearing on forestry. The annual meetings of the Association gave rise to what is known as the Forest Week, when all societies whose interests are associated with Swedish forestry in some way or other, hold their annual meetings at Stockholm. Schotte was one of the leaders in organizing this week.

Perhaps, however, what interested him most was the organizing of the excursions of the Association. These soon attracted great numbers of foresters from various parts of the country and of late also from our neighbors. Independently or in conjunction with the forest owners whose forests were to be visited, Schotte compiled special directions containing accounts of the different measures applied in the places to be visited. It is obvious that by this means was laid a good foundation for a searching discussion of essential points, and there is no doubt that these very excursions have been of immense importance in increasing and spreading interest in a rational management of forests in this country. During these excursions Schotte also was in a position to demonstrate the use of many of the numerous experimental areas he had mapped out on behalf of the Forestry Institute for the study of questions of production, thinning and provenience. Research work at an experimental forestry institute is necessarily carried on with an eye to the future. Scientific results ripen only slowly; that is in the very nature of the forest. Hence it is all the more important for practical men to follow the progress of the research work, so as to be able to see for themselves the general trend of development. For this reason the excursions of the Forestry Association have been of immense importance for the work of the Institute itself. More than many a bulky treatise they have helped to bring home to our foresters the importance of experimental forestry and have increased their interest in the careful observation of the very life of the forest.

The external circumstances surrounding Gunnar Schotte's life and work at the Institute are simple enough. In June, 1902, he was appointed assistant at the new institution. In this capacity he served till March 16th, 1905, when he received an appointment under the Crown Lands Board, but on the 1st of January, 1909, he returned to his old post and then as the head of the institution. When later on the institution was reorganized and was made a permanent state establishment, he became the head of the forestry section with the title of pro-

fessor, and was at the same time appointed the director of the whole institution. These simple facts represent a great amount of intensive organization and research work.

The Institute of Experimental Forestry was, in the beginning, an institution organized on a very modest scale. In 1902 the Institute was supported by a special government grant amounting the first year to 16,000 kronor; the staff consisted of four officials, one of whom, who had the title of "botanist," enjoyed the magnificent annual salary of 1,500 kronor, but then the duties were no more than in proportion. Its premises were a small rented flat of five rooms and a kitchen in a house in Norra Smedjegatan. It is only fair, however, to acknowledge that from the very beginning the authorities showed a favorable and appreciative disposition towards the demand for fresh grants and towards proposals for requisite extensions, but it was not until 1910 things began to move at a quicker pace. From the 1st of January, 1913, the Institution has been a permanent state establishment, and since the autumn of 1915, it has had its own building situated on the shore of Brunnsviken near Frescati not very far from Stockholm. It is now organized in four sections, namely, the forestry section, the natural history section for botany and soil science, the section for entomology, and, supported by an extraordinary grant, the section for regeneration experiments in Norrland. The staff has grown in proportion to this organization, and now consists of four heads of sections, three of whom are on the permanent staff with the title of professor, one chief assistant, five assistants, four forest hands, five women clerks, and one porter. A similar rapid development of a practically scientific institution is of course not one man's work; many good workers have cooperated, and the times have been favorable. It is evident, however, that a heavy burden of organizing work rested on Gunnar Schotte's shoulders, and besides he spared no pains when it was a matter of piloting questions of supply past all the hidden rocks that might have been encountered in the shape of an energetic minister of finance, an economical Government, and a scrutinizing Riksdag.

To Gunnar Schotte is due a very important initiative in the development of the institution, namely, the creating of special experimental parks. These consist of forests placed wholly at the disposal of the Institute. The actual forestry work is done by the staff of the Institute, whereas the yield goes to the owner of the forest. At present there are three parks of this kind, namely, Siljansfors in Dalecarlia,

Svartberget-Kulbäcksliden in Västerbotten, and Tönnersjöheden in Halland, the first belonging to Stora Kopparbergs Bergslags Aktiebolag, the others to the State. To the scientific work of the Institute the establishment of these experimental parks means concentration and deepening, besides which the practical value of its research work is rendered easier by them. The danger is that purely administrative work will encroach too much on the time that ought to be devoted to the solution of forestry problems. The future will have to show if the Institute can avoid this difficulty.

I have now given an account of Schotte's administrative and organizing work, and what he found time to do in this field would have been quite a sufficient achievement for many another man, yet in addition he found time for comprehensive literary work in forestry. Surveying his very numerous publications, one may say that he sought to concentrate on four different groups of subjects, namely the question of the importance of provenience to the development of the plant in sowing or planting, the productive capacity of various kinds of trees, the thinning question, and the forest-producing power of our heaths.

With a view to studying the importance of provenience the forest section of the Institute under Schotte's direction arranged numerous experimental areas in various parts of the country, especially in the North. The point was to study the pine, which, on the face of it, is divided into a great number of climate races. I do not think I am guilty of any exaggeration in asserting that at present no other country possesses so extensive and well planned an attempt for the study of the importance of provenience to a certain kind of tree as this great experiment arranged by Schotte. In a couple of treatises he has given an account of the results so far achieved.

Schotte's botanical interests attracted him towards the foreign conifers, among which the larch with its numerous races and species grown also in our country aroused his special, almost affectionate attention. It was about the larch and its importance to Swedish forestry that he wrote his greatest and most comprehensive forestry work, a production that ranks high among monographs on trees.

To the question of thinning he gave perhaps more attention than to any other forestry problem. He advocated very radical thinnings, and laid out for the study of this problem a great number of experimental areas—about 600—spread all over the country from North to South. But he did not find time for a thorough study of these areas,

only for a few preliminary notices. It is in the very nature of the forest that it should take a long time before the results of thinning measures become apparent and can be safely estimated. But it is some very imposing experimental material that Schotte leaves behind, in all probability so far the most comprehensive any institute of experimental forestry has at its disposal. By an admirably arranged system of registration and accurate comprehensive notes he has provided for his successor being in a position to utilize, for the benefit of Swedish forestry, the work expended on the experimental areas. He often came back to his old love of heaths: in a lecture at the Academy of Agriculture a few years ago he dealt with the question of the forest producing capacity of the heaths. It is clear that he was enthusiastic about this subject, it having become apparent that highly productive forests can be raised on our heaths.

I have now sought to give a picture of Schotte in his organizing and scientific activity for the furthering of the cause of forestry in our country. Never did he spare his strength, never did he hold aloof when it was a matter of doing something for this cause that he had such a keen and warm interest in. His unquenchable love of work, however, attracted him to other fields, which as lying rather outside forestry interests I do not propose to enter upon. Let me mention only one more phase of his many interests, his work for the Society of Dendrology and Park Conservation. Here he was one of the originators, became the first deputy chairman of the Society, and was during the whole of his life one of its most strenuous supporters.

To his colleagues he was always an exemplar of a joy of work that shirks no sacrifices, and of enthusiasm for the tasks he set himself. His optimism recognized no difficulties when called upon to work for forestry interests, his power of work and his working hours knew no limits. The young institution whose head he had been can not pay a better tribute to his memory than by making an earnest endeavor to feed, and be warmed by, the sacred fire that urged him onward. I am confident that it will be so. Among his comrades in work his memory will live honored, revered and loved, and in like manner his name will live among those who are zealous for the rational management of our forests.



## COMPARISON OF DIAMETER TAPE AND CALIPER MEASUREMENTS IN SECOND-GROWTH SPRUCE

BY C. EDWARD BEHRE

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In the preparation and application of volume tables and yield tables, it is of interest to compare the differences in diameter measurements obtained with diameter tape and with calipers.

Since the diameter tape is calibrated for circles, it will tend to give an exaggerated diameter when applied to eccentric or irregularly shaped stems. Positive errors also arise in using the diameter tape, because it will be supported by all the ridges or high places on the circumference of the stem and tend to bridge the lower places. Failure to run the tape horizontally around the stem also results in positive errors. It would therefore appear that errors in the use of the diameter tape are non-compensating, all tending to exaggerate the result, and therefore we would expect measurements with the tape to over-run those obtained with calipers. The difference might be expected to increase with size and irregularity of the cross section and of the bark, and since species differ in these respects the discrepancies should be investigated for different species separately. In order to obtain consistent results, measurements collected for the preparation of volume tables should all be taken with the same instrument. Once the tables are prepared, however, it makes no difference which instrument is used in work involving the application of the tables, provided only that the same instrument is used throughout any one study. Thus, suppose we have a set of volume tables based on measurements taken with diameter tape. We can apply these tables perfectly safely to a cruise in which calipers were used, but since we may expect the tape to over-run the calipers the result will be slightly lower than if the same stand had been tallied with the tape. The discrepancy lies in the tally itself and not in the volume table used. From this it also follows that in the preparation of yield tables it makes no difference whether the plots are measured with the same instrument as was used in the preparation of the volume tables to be applied or not. The resultant yields may be slightly higher if the tape is used for the plot tallies than if calipers are used, but the instrument used in preparing the volume table will have no effect. In order to compare yields from different localities, the instrument with

which the stands were tallied should be stated in each case, and differences allowed for if they are shown to be significant.

It remains, therefore, to determine the importance of the discrepancies in the use of the two instruments for the timber in question, in order to interpret properly results obtained with one in terms of results with the other. For this purpose a series of measurements were obtained in stands of second growth white and red spruce on Mt. Desert Island, Maine. Each tree was first measured at breast height in at least two directions with the calipers to the nearest 0.1 inch, and then measured with the tape at exactly the same point. The caliper measurements were usually taken on the longest diameter and at right angles to it; but on some trees, either because of individual peculiarities, such as a distinctly flat face, or because the maximum diameter was not readily determined, an additional pair of measurements at right angles to each other and intermediate between the first pair was taken. The measurements thus taken were averaged for comparison with the diameter tape results. The differences noted must be expressed in terms of effect upon volume to be useful.

Let  $D$  = diameter at breast height.

$A$  = difference in diameter at breast height.

$H$  = total height.

$f$  = absolute form factor.

$d$  = sign of the derivative.

Then the volume of the tree is  $\frac{\pi}{4} D^2 H f$ ; and by differential calculus, the rate of change of volume with change of diameter,  $\frac{dV}{dD} = \frac{\pi}{2} D H f$ . For a difference in diameter, " $a$ ," the change in volume will therefore be  $\frac{\pi}{2} a D H f$ . To make results comparable, regardless of size, this should be expressed as a percentage of the volume. Thus,

$$\frac{\frac{\pi}{2} a D H f}{\frac{\pi}{4} D^2 H f} \times 100 = \frac{200a}{D} =$$

percentage change in volume resulting from difference in diameter, " $a$ ."

These percentages were computed for the individual trees using the average of the caliper measurements as the base for comparison, and also as an average for all the trees tallied in each stand. In the latter

case, the arithmetic average of the difference in measurements was substituted as "a" and the arithmetic average of the average calipered diameters was used as "D" in the above formula. The percentage thus obtained will be larger than if the trees had been weighted by basal area in obtaining their average diameter. Furthermore, the trees measured were selected from among the larger size classes, and the more knotty or irregularly shaped trees, rather than as an average run of the stands in which they occurred, and hence the results may be considered as maximum rather than average discrepancies in their respective stands.

Table I presents the data for 36 trees measured for this purpose in a rather open-grown even-aged stand of pure white spruce 50 years old. This stand ran 756 living trees per acre, and the average diameter weighted by basal area was 6.66 inches. Eighty-five per cent of the trees were less than nine inches in diameter, which was the average of those measured for the study. Of these 36 trees, 16 showed no discrepancies, in 16 the tape over-ran the calipers from 0.05 inch to 0.20 inch, and in four the tape under-ran the calipers. The maximum individual discrepancy amounted to 3.3 per cent of volume, and the average, computed as outlined above, was 0.70 per cent.

Table II presents similar data for 18 large white spruce and 18 large red spruce taken from an irregular, broken, second-growth stand of mixed red and white spruce about 70 years of age. A stand of this character represents the maximum sizes which will have to be measured in dealing with second-growth spruce. Of the white spruce in this tally, eight showed no discrepancies, nine showed positive errors in the tape of 0.05 inch, or 0.10 inch, and one showed a negative error of .05 inch. The maximum individual discrepancy in volume was +2.1 per cent and the average was 0.62 per cent. Of the red spruce, five showed no discrepancies, eight showed positive errors with the tape from 0.05 inch, to 0.25 inch, and five showed negative errors of 0.05 inch or 0.10 inch. The maximum individual discrepancy in volume was +3.6 per cent and the average was 0.53 per cent.

From these figures it would appear that practically no importance need be attached to the choice of instruments for measuring diameters in second growth red and white spruce.

TABLE I

COMPARISON OF DIAMETER TAPE AND CALIPER MEASUREMENTS.

*White Spruce*

Tree No.	Diameters Breast High				Difference		
	Tape	Calipers		Caliper Average	Ins.	Vol.	%
1.....	4.7	4.8	4.6	4.7	—	—	
2.....	5.75	5.8	5.7	5.75	—	—	
3.....	6.4	6.4	6.3	6.35	+.05	+1.6	
4.....	6.4	6.4	6.4	6.4	—	—	
5.....	7.0	7.2	6.9	7.05	-.05	-1.4	
6.....	7.2	7.2	7.1	7.15	+.05	+1.4	
7.....	7.3	7.6	7.0	7.3	—	—	
8.....	7.3	7.5	7.3	7.4	-.10	-2.7	
9.....	7.5	7.6	7.4	7.5	—	—	
10.....	7.7	7.8	7.6	7.7	—	—	
11.....	7.85	7.9	7.8	7.85	—	—	
12.....	8.0	8.0	7.8	7.9	+.10	+2.5	
13.....	8.1	8.3	8.0	8.15	-.05	-1.2	
14.....	8.4	8.5	8.2	8.35	+.05	+1.2	
15.....	8.5	8.5	8.5	8.5	—	—	
16.....	8.6	{ 8.6 8.7 }	{ 8.3 8.6 }	8.55	+.05	+1.2	
17.....	8.7	8.9	8.5	8.7	—	—	
18.....	8.6	8.9	8.5	8.7	-.10	-2.3	
19.....	8.8	9.0	8.6	8.8	—	—	
20.....	9.0	9.0	9.0	9.0	—	—	
21.....	9.2	9.3	9.1	9.2	—	—	
22.....	9.6	9.8	9.1	9.45	+.15	+3.2	
23.....	10.1	10.0	10.0	10.0	+.10	+2.0	
24.....	10.3	{ 10.5 10.3 }	{ 10.3 10.0 }	10.3	—	—	
25.....	10.3	10.4	10.2	10.3	—	—	
26.....	10.4	10.6	10.0	10.3	+.10	+1.9	
27.....	11.1	{ 11.1 11.2 }	{ 10.8 11.0 }	11.0	+.10	+1.8	
28.....	11.1	{ 11.1 11.3 }	{ 10.8 10.9 }	11.0	+.10	+1.8	
29.....	11.4	{ 11.3 11.7 }	{ 11.1 11.1 }	11.3	+.10	+1.8	
30.....	11.4	11.6	11.2	11.4	—	—	
31.....	11.8	11.9	11.5	11.7	+.10	+1.7	
32.....	12.3	12.8	11.4	12.1	+.20	+3.3	
33.....	12.3	12.4	12.2	12.3	—	—	
34.....	12.5	12.9	12.0	12.45	+.05	+0.8	
35.....	12.8	13.0	12.5	12.75	+.05	+0.8	
36.....	14.1	{ 14.4 14.2 }	{ 13.3 14.1 }	14.0	+.10	+1.4	
Average		9.236		9.204	+.032	+0.70	



TABLE II

COMPARISON OF DIAMETER TAPE AND CALIPER MEASUREMENTS.

*White Spruce*

Tree No.	Diameters Breast High Caliper				Difference	
	Tape	Calipers	Average		Ins.	Vol. %
1.....	9.4	9.5	9.3	9.4	—	—
2.....	9.5	9.6	9.2	9.4	+10	+2.1
3.....	10.4	10.4	10.2	10.3	+10	+1.9
4.....	10.5	10.9	10.1	10.5	—	—
5.....	10.7	10.8	10.6	10.7	—	—
6.....	10.8	11.0	10.6	10.8	—	—
7.....	11.4	11.6	11.1	11.35	+05	+0.9
8.....	12.0	12.3	11.6	11.95	+05	+0.8
9.....	12.2	12.4	12.0	12.2	—	—
10.....	12.9	{ 12.9 12.5 }	12.8	12.8	+10	+1.6
11.....	13.1	13.7 12.3	13.0	13.0	+10	+1.5
12.....	13.6	{ 13.9 13.5 }	13.5	13.5	+10	+1.5
13.....	13.6	13.9 13.3	13.6	13.6	—	—
14.....	14.8	14.8 14.8	14.8	14.8	—	—
15.....	14.85	15.2 14.4	14.8	14.8	+05	+0.7
16.....	15.2	{ 15.4 15.2 }	15.25	15.25	—05	—0.7
17.....	15.4	15.5 15.1	15.3	15.3	+10	+1.3
18.....	15.8	16.1 15.5	15.8	15.8	—	—
Average 12.564				12.525	0.39	0.62

*Red Spruce.*

1.....	8.1	8.3	7.8	8.05	+05	+1.2
2.....	10.0	10.2	10.0	10.1	—10	—2.0
3.....	10.6	10.7	10.4	10.55	+05	+1.0
4.....	10.8	11.1	10.5	10.8	—	—
5.....	10.8	11.0	10.7	10.85	—05	—0.9
6.....	11.9	12.2	11.6	11.9	—	—
7.....	12.1	12.5	11.6	12.05	+05	+0.8
8.....	12.1	12.2	12.0	12.1	—	—
9.....	12.6	13.2	12.2	12.7	—10	—1.6
10.....	12.7	12.9	12.7	12.8	—10	—1.6
11.....	12.8	12.9	12.7	12.8	—	—
12.....	13.0	{ 13.0 12.5 }	12.9	12.9	+10	+1.6
13.....	13.4	13.9 13.1	13.5	13.5	—10	—1.5
14.....	14.0	14.5 13.0	13.75	13.75	+25	+3.6
15.....	15.4	15.5 14.9	15.2	15.2	+20	+2.6
16.....	15.6	16.0 14.8	15.4	15.4	+20	+2.6
17.....	15.9	{ 16.4 15.8 }	15.9	15.9	—	—
18.....	16.8	17.0 16.3	16.65	16.65	+15	+1.8
Average 12.700				12.667	+0.033	+0.53

## THE DETERMINATION OF TREE VOLUME BY PLANIMETER

BY L. H. REINEKE

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The usual computation of tree volumes by formula, such as Sma-lian, Newton or Huber, involves a considerable amount of work. Also, unless small sections are used in computing the butt an error may be introduced which, when dealing with pulpwood species, can not be ignored.

The true volume in cubic feet may, however, be measured from the area of a taper curve when cross-sectional areas are plotted instead of the usual diameter measurements, thus making the area of the graph proportional to the volume of the tree. With the ordinate representing *area* in square feet and the abscissa representing *height* in feet, the area inclosed between the curve and the axis represents *volume* in cubic feet. Moreover, the area between any two ordinates, the curve and the x-axis represents the volume of that section of the tree. By the use of a planimeter these areas may be measured and the volume of the tree or of any part of it may thus be easily determined from a graph of this type.

The preparation and use of such graphs is very simple. It is not even necessary to determine from a table the areas corresponding to given diameters; an auxiliary area scale, on which diameters have been marked opposite their corresponding areas, may be used. In the finished scale the area graduations used in locating the diameter graduations may be omitted, as illustrated by the right hand edge of the scale shown in Fig. 1A. The zero of this scale is held on the x-axis and the point plotted opposite the proper diameter graduation. Fig. 1B shows the form of such curves for various species. These will be discussed in detail later.

The use of ordinary coordinate paper with this scale is advantageous since the graduations of the paper may be employed in averaging graphically and in balancing deviations<sup>1</sup> when drawing the curve.

After the curve is drawn the graph area may be determined with the planimeter. Two circuits should be made, the second as a continu-

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<sup>1</sup> In all curve drawing, of course, it is essential that the sum of the weighted positive and negative deviations shall be equal and as evenly distributed as possible throughout the length of the curves.

ation and check of the first, recording the readings at the start of the first and at the end of each circuit as illustrated in the third column of the tabular portion of Fig. 1B. A slightly more accurate value is obtained by using the average of two readings in close agreement. If the first two readings are not in close agreement a third circuit should be made to check one of the others. With graph areas less than 25 sq. in. readings should not differ by more than .01 sq. in. A difference of .02 sq. in. is permissible for graph areas between 25 and 50 sq. in. and of .04 sq. in. between 50 and 100 sq. in. With these limits the allowable error is well below 0.1 per cent, an accuracy of measurement easily obtainable.

The volume is obtained by multiplying the graph area, as indicated by the planimeter, by the proper converting factor—the product of the scale moduli used (sq. ft. of area per inch times ft. of ht. per inch).

By selecting the proper scales for area and height the factor for converting the graph area in square inches into volume in cubic feet may be made a small whole number. Thus, in the example shown, an area scale of 0.4 sq. ft. per inch and a height scale of 10 ft. per inch makes 1 sq. in. equivalent to 4 cu. ft.

An advantage of the method is that it eliminates the error due to failure of formulae to fit exactly the tree or sections of the tree. (See discussion under Tests and Results, sections 3 and 4.) The results are absolutely independent of any assumptions as to geometric form and their accuracy depends almost entirely upon the accuracy of the field measurements, for the method is self-checking, with an accompanying increase in accuracy.

Another source of error eliminated is that of averaging diameters. Since areas vary as the square of the diameters, the area corresponding to an average diameter is less than the average area, and a tree of average diameter, therefore, has a volume less than the tree of average basal area. This is illustrated by curves 4 and 5, Fig. 1B, in which No. 5 represents a group of eight trees (one two-inch d. b. h. class) averaged by diameter and No. 4 represents the same group averaged by area. No. 5 gives a volume 5.01 per cent less than that of No. 4.

The average of the points plotted by this system given here is the average of the areas, and the averaging of areas represented by points so plotted can be done graphically.

Another advantage of the method is that fewer measurements are necessary to get the needed accuracy in the butt section. A measurement at b. h. should be sufficient except in extreme cases, such as tupelo (curve No. 7, Fig. 1B). The field work necessary is further reduced because the plotting of each tree eliminates the error due to varying lengths of sections; measurements therefore need not be made at even intervals to remove this error but may be taken at the end of each log as cut.

In addition to these advantages the utility of such curves for other purposes is not impaired. Heights and diameters may be read as usual. A slight disadvantage exists in the plotting and reading of the very small top diameters because the areas involved are so small but this gives no trouble within the limit of usable values—down to the three-inch minimum of most field measurements. Smaller diameters are seldom taken in the field (except with very small trees, for which a larger scale may be used) and the volume concerned—which is of chief interest—is so small that no significant error can possibly be introduced.

#### DETAILS OF THE METHOD

1. In drawing the curve, if the stump is to be treated as a cylinder, this portion of the curve is drawn as a horizontal line from stump to ground, the ground being represented, of course, by the vertical axis.

2. When each tree is plotted on a separate sheet the outside bark and inside bark diameters may both be plotted, thus affording a visual comparison of bark and wood volumes. The bark may also be measured separately, if desired.

3. When an entire d. b. h.-ht. class is plotted on one sheet the bark measurements may be plotted on a separate sheet. To plot bark measurements alone, the auxiliary scale is so placed that the i. b. diameter graduation is on the x-axis and the point is then plotted opposite the o. b. diameter graduation.

4. The operation of the polar planimeter is such that it is desirable to place the pivot outside of the graph area to be measured to avoid the necessity of applying a correction to the reading. If the pivot is placed near the point indicated in Fig. 1B this condition is satisfied and the planimeter wheel will not go off the paper. This latter point is not essential but is conducive to greater accuracy.

5. In following the curve boundaries with the planimeter tracer point, a straight edge should not be used along the axis. The saving in time is negligible and a slight misplacement of the straight edge will



prevent a close check, since the error does not compensate as it does in free-hand manipulation of the planimeter.

#### OTHER APPLICATIONS

1. When a paraboloid is plotted by this system a straight line results and tree form may thus be easily compared with a paraboloid. This feature, then, permits a simple graphic comparison between true volume and volume by Smalian formula. The graph area between any section of the curve and a straight line connecting the ends of that section represents the excess or deficit in the computed volume of that section. This is illustrated in Fig. 1B, curve No. 3.

2. The auxiliary diameter-area scale may be used to advantage in the preparation of *d. b. h.—age* curves in yield study work.

3. In conjunction with this method of determining cubic volumes the following system can be used in determining board foot volumes:

The auxiliary scale illustrated has, in addition to the diameter graduations, two series of graduations showing the volume of 16-foot logs, by Scribner and International 1/8 rules. In preparing these additional scales the log rule values were first plotted and curved, removing in the curving only those irregularities due to rounding off to the nearest 5 or 10 board feet. The values from these curves were then plotted opposite the appropriate diameter graduations.

These scales are used as follows:—the zero point is placed on the height axis at the end of each 16-foot log and the board foot volume of that log is read at the intersection of the curve and the scale. (The auxiliary scale should be on celluloid so that the graph can be seen through it.) The short length between the last whole log and the top limit is scaled as a fraction of a log of the top-limit diameter.

This system eliminates the reading of diameters and reference to a log rule; in addition it gives values interpolated for the fractional inches of diameter, thus making the final curving of the volume table somewhat easier. This system may also be used with the ordinary taper curves, in which *diameters* are plotted. In this case the log rule values must be marked opposite the diameters, rather than the corresponding areas.

#### TESTS AND RESULTS

1. The form of taper curves plotted by this system is shown in Fig. 1B. Curves Nos. 2 and 6 are for Southern white cedar, taken from taper tables made by multiple correlation. Curves Nos. 4 and 5

are for Western yellow pine; Nos. 1 and 3 are for shortleaf pine, and No. 7 is for tupelo. These latter five curves were drawn from the field measurements and Nos. 1, 4 and 7 are typical of the species.

2. Nos. 4 and 5, for the 16 inch—six log class of Western yellow pine (eight trees), show the difference in volume due to averaging by diameter instead of by area. The volume of No. 5 (averaged by diameters) is 5.01 per cent less than that of No. 4.

3. The dotted straight lines of curve No. 3 (a very full-boled shortleaf pine) indicate the volume obtained by Smalian's formula, the graph area between these straight lines and the curve representing the excess or deficit in volume computed by the formula.

4. Curve No. 7, for tupelo, serves to illustrate the possible errors when volumes are computed by formulae. The graph area between the curve and the horizontal dotted line from d. b. h. to ground represents the volume omitted when cubing the tree as a cylinder from b. h. down. The graph area between the curve and a straight line from the end of the first half log to the stump would represent the excess volume given by Smalian's formula for that section. An analysis of the 8-foot butt logs of 70 tupelo trees also shows a large error when Newton's formula is applied to the butt as a single section.

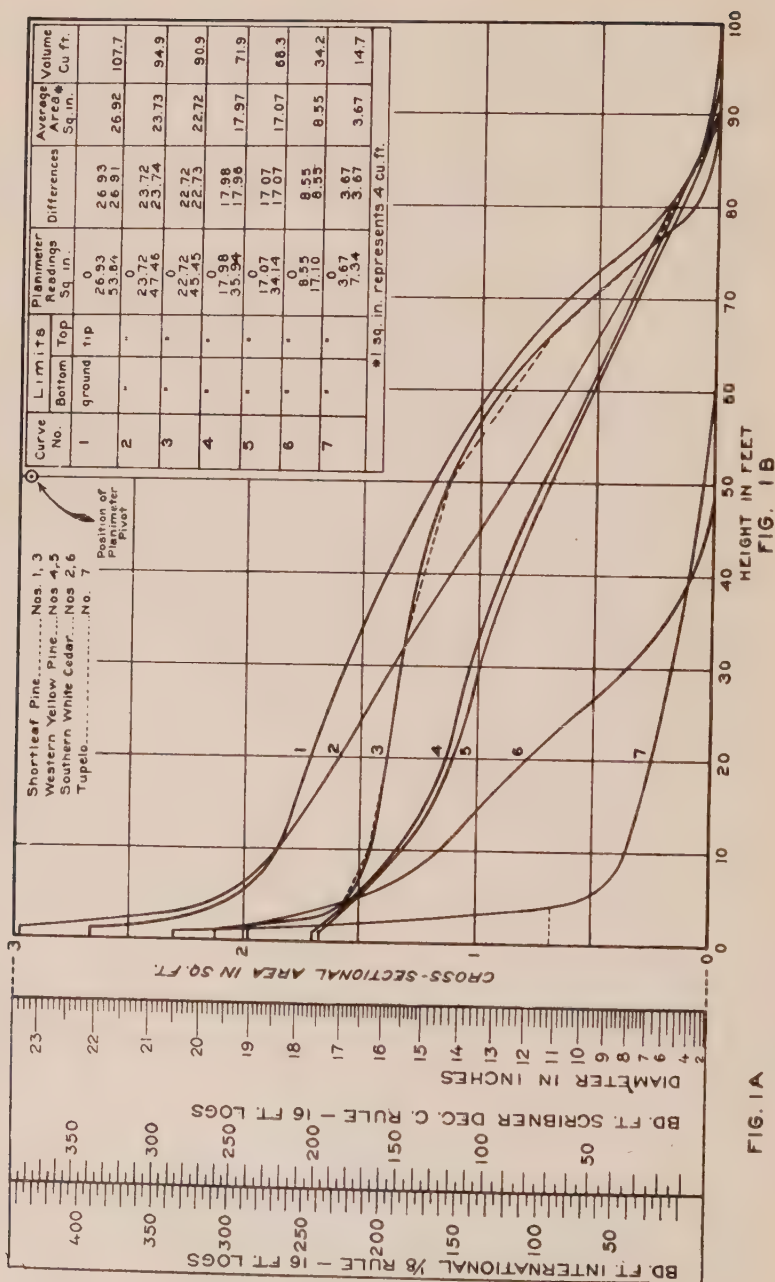
5. Records were made of the time necessary for each step of the work and the following tabulation gives the results.

	Time for checked results		
Cubing by formula, measurements at 10-foot intervals .....	18.40	minutes	per tree
Cubing by planimeter, individual trees...	12.22	"	" "
Cubing by planimeter, by d. b. h.-ht. classes .....	5.43	"	" "
(Average of 4 trees per d. b. h.-ht. class)			
Planimetering only (included in above) ..	4.42	"	" " curve

Cubing by formula was done by an experienced clerk aided by a table of half-areas of circles. This work was also expedited by having measurements at 10-foot intervals. No great degree of skill in the use of the planimeter had been attained when this work was done.

#### SUMMARY

1. *Arcas* are plotted and averaged instead of diameters, eliminating one source of error. Volume is represented by graph area which is measured by the planimeter, an accurate instrument.



2. No errors are introduced by assumptions as to the geometric form of the trees and the accuracy of the results depends entirely upon the accuracy of the field measurements.

3. The method is self-checking.

4. The curves may be used for any other purpose for which ordinary taper curves may be employed.

5. Fewer field measurements are needed for the butt section and measurements need not be taken at regular intervals.

6. In addition to the saving of time in the field there is a saving of time in computation of data, accompanied by an increase in accuracy. *A saving of as much as three-fourths of the time necessary for cubing is possible in those cases where taper curves must be prepared anyway, whether for combination of measurements at odd intervals or for other purposes.*

7. More accurate board foot volumes are obtained and a further saving in time is effected by use of the auxiliary board foot scales. This is not peculiar to these graphs alone but can be applied to the usual form of taper curves as well.

In general, then, the method described gives accurate results, effects a saving of time in both field and office work, and is not influenced by the form of the trees.



## THE STEM FORM AND FORM QUOTIENT OF SECOND-GROWTH REDWOOD

BY FRANCIS X. SCHUMACHER

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The degree of taper of forest-grown timber trees has been expressed by equation  $q = \frac{d}{D}$  in which "q" is form quotient or degree of taper, "d" is diameter half way between tip and breast height, and "D" is d. b. h. It varies with individual trees usually ranging from .50 to .80. Trees that have the same degree of taper seem to have practically the same form inside bark throughout the length of their boles above breast height. Höjer expresses this by the equation

$$\frac{d}{D} = C \log \frac{c + l}{c}$$

in which "d" is diameter inside bark, "l" is length in per cent from tip to breast height, "D" is d. b. h., inside bark, and "C" and "c" are constants (2). Tor Jonson has published taper and volume tables based on diameter, height and form from this equation (5). He groups form quotients into form classes .50, .55, .575, .60, .625, .65, .675, .70, .725, .75, .775, and .80 with a difference between classes of about 4 per cent of cubic volume.

A number of European and American species have been compared with Höjer's equation. Most of them, however, tend to have less diameter in the upper parts of the stem, especially in the higher form classes, than the equation gives. Noting this, Behre in investigating the form of Western yellow pine, developed an equation which seems more nearly to fit the average of species measured in the upper parts of the stem, while retaining the excellent conformity of Höjer's equation in the lower half. His equation has the form  $\frac{d}{D} = \frac{l}{a + bl}$ , "l" in this case being length above breast height in per cent, while "a" and "b" are constants (2).

When root-swelling extends above breast height, form quotient is distorted, as neither the Höjer nor Behre series consider it. Trees whose tapers were compared to their series either were picked because they had no root-swelling above breast height, or root-swelling was eliminated graphically after plotting each tree on cross-section paper.

Since form seems to be so nearly independent of species among conifers, volume tables based on diameter, height and form should be universally applicable after certain corrections for each species are made. Among these would be the following:

1. Correction for bark thickness, which varies with species. Diameters are measured outside bark in cruising and the equations fit taper inside bark.

2. Correction for root-swelling, as this seems to vary not only with species but with size and possibly also with other factors.

3. Correction for form, if a particular species varies sufficiently in taper from the equation to necessitate it.

Even with these corrections, studies of the average form of species and stands are necessary before the proper table can be applied in a given case. Stand form class varies with density. It may be found by felling sample trees and measuring diameters at breast height and at half the height above breast height; by using tree climbers to measure upper diameters; by using a dendrometer; or it may even be judged from experience. Jonson suggests the form point method of finding stand form class. Form point is the height to the center of gravity of a tree's crown. It is easily measured and a fair correlation has been found to exist between it and form class for several European species. However, the method is not universally satisfactory (8).

If stand form class can be found with little labor and proper corrections for species applied, tables based on a form equation should apply universally in any unit of measure or degree of utilization used in their construction.

With these things in mind, the stem form of second-growth redwood was compared with the Höjer and Behre equations.

#### COMPARISON OF REDWOOD WITH EQUATIONS

The data used in this study were taken from about 1,000 stem analyses of second-growth redwood (*Sequoia sempervirens* Endl.) collected by the U. S. Forest Service in Del Norte and Humboldt counties, California, in 1899, and about 125 stem analyses by the Division of Forestry of the University of California, in Mendocino county in 1923. Taper curves were made for 694 trees chosen from these two lots on which sufficient measurements have been taken and which seemed of normal form. Diameter measurements and ring counts were usually taken every 8 feet or 10 feet above stump. Those whose uppermost

diameters were measured at lengths less than 75 per cent of total height above breast height were rejected, unless they were of very even taper. Actual diameters along the stem were plotted for each tree and the points connected by straight lines. The trees ran from 3 inches to 38 inches d. b. h. and from 11 years to 65 years in age.

Root-swelling was eliminated on the assumption that it is as correct, and more consistent, to find form quotient, not by the per cent that diameter at half the height above breast height is of the *graphed* "normal d. b. h.," but by the per cent relation of diameter at half height above breast height to diameter at some point above root-swelling (10 per cent or 20 per cent above breast height). This relation can then be referred to percentages between diameters at corresponding lengths of either Höjer's or Behre's equation, the correct form class ascertained, and normal diameters for any point below root-swelling computed. It seems immaterial which equation is used as the difference between them is less than one per cent of d. b. h. at any point on the lower half of the stem in any of the form classes given.

By inspection, then, the taper curves were grouped into three classes: those that had no root-swelling as high as breast height, those whose root-swelling extended above breast height but not as high as 10 per cent of length above, and those whose root-swelling extended 10 per cent of length or more above. In no case did root-swelling extend as high as 20 per cent of length above breast height.

A chart was prepared from Höjer's equation showing two graphs, one connecting points for diameters at half height above breast height divided by diameters at 10 per cent of length, the other for diameters at half height divided by diameters at 20 per cent of length, for the various form classes. With form class as abscissa and these quotients as ordinate, this chart proved very convenient.

The two groups of trees that showed root-swelling above breast height were referred to the chart, and normal diameters at breast height, and at the first tenth above breast height, if necessary, found. Diameter at each tenth of length above breast height, in per cent of normal d. b. h. was computed for each tree, the trees grouped into form classes in multiples of .05, and the average series for each class compared graphically with the Höjer and Behre equations (Figure 1). Obviously, the latter equation shows by far the better fit.

It seems that second-growth redwood, in the higher form classes, tapers more in the upper parts of the stem than any species so far re-

## PER CENT TAPER SERIES

Second growth Redwood compared with  $\frac{a}{D} = C \log \frac{c+1}{c}$  (Höjer.)

and with  $\frac{d}{D} = \frac{1}{a+bl}$  (Behre.)

----- Behre  
 ————— Höjer  
 ○ Redwood

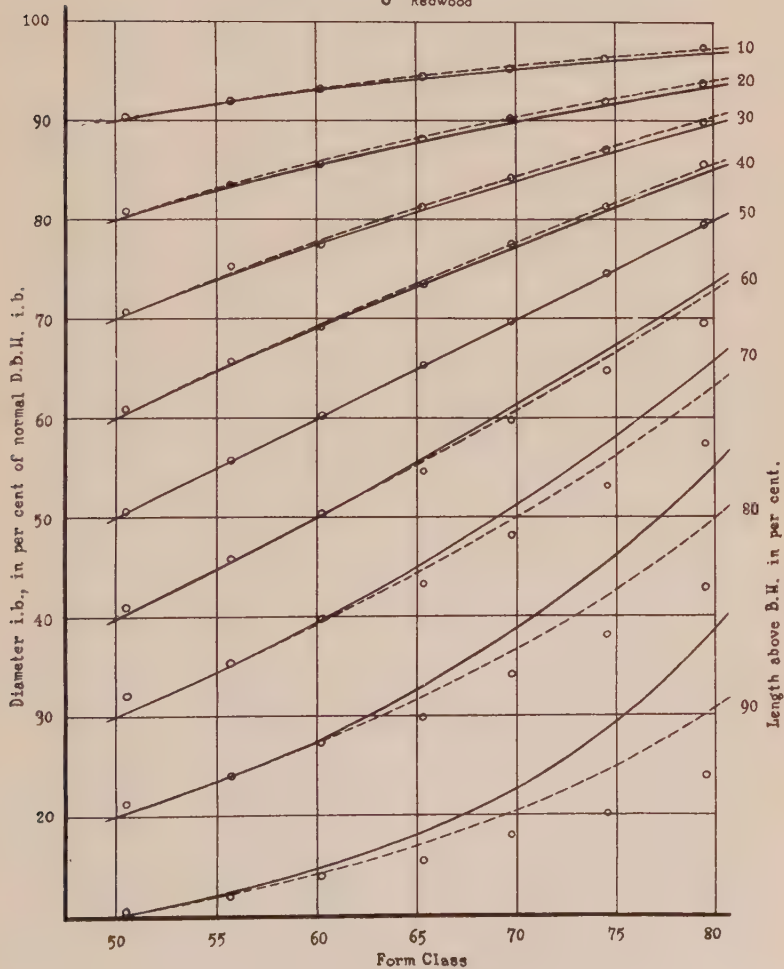


Figure 1.



ported. The same rapid taper, however, was noted in a sample of two other species of the redwood region, 16 Sitka spruces from 5 inches to 46 inches d. b. h. and the same number of Western hemlocks from 5 inches to 37 inches d. b. h. Whether such taper is a peculiarity of young timber whose diameter growth in the upper parts of the stem can not keep pace with rapid height growth, is not, at present, known. But, whatever its cause, it has little effect, naturally, on cubic volume as the following comparison of absolute form factors shows:

ABSOLUTE FORM FACTORS. REDWOOD COMPARED WITH THE BEHRE  
EQUATION \*

Form Class	No. of Trees	Absolute Form Factor		Deviation of Redwood in per cent
		Behre	Redwood	
.505	23	.339	.342	+0.9
.557	54	.374	.376	+0.5
.602	148	.407	.406	-0.2
.653	197	.445	.440	-1.1
.697	177	.481	.477	-0.8
.745	75	.525	.515	-1.9
.795	20	.575	.557	-3.1

To study effect of size on form, the trees were grouped into broad diameter classes within each form class. No consistent variation was apparent. Form, also, seems to be independent of crown class.

ROOT-SWELLING AND BARK THICKNESS

With actual and normal d. b. h. inside bark of each tree known, it was possible to study root-swelling. The per cent relation of normal d. b. h. was computed for each inch class and plotted (Figure 2). A straight line seems to correlate them best. Normal d. b. h. inside bark in per cent of actual d. b. h. inside bark, decreases with increase in diameter from 100 per cent for 3 inch trees to 86.5 per cent for 34 inch trees inside bark. This rate of decrease must lessen, however, or become absurd, as the great diameters of old virgin redwood are reached.

D. b. h. inside bark is about 85 per cent of d. b. h. outside bark (6). With this correcting factor, the per cent relationship between normal d. b. h. inside bark and actual d. b. h. *outside bark* was found to decrease from 100 per cent for 3 inch trees to 73 per cent for 40 inch trees.

As height within diameter class increases, root-swelling increases, but only to a negligible extent, varying by less than two per cent for

\* The extra volume of redwood due to root-swelling is not considered in this table.

# RELATION BETWEEN "NORMAL" DBH. INSIDE BARK AND "ACTUAL" DBH. INSIDE BARK.

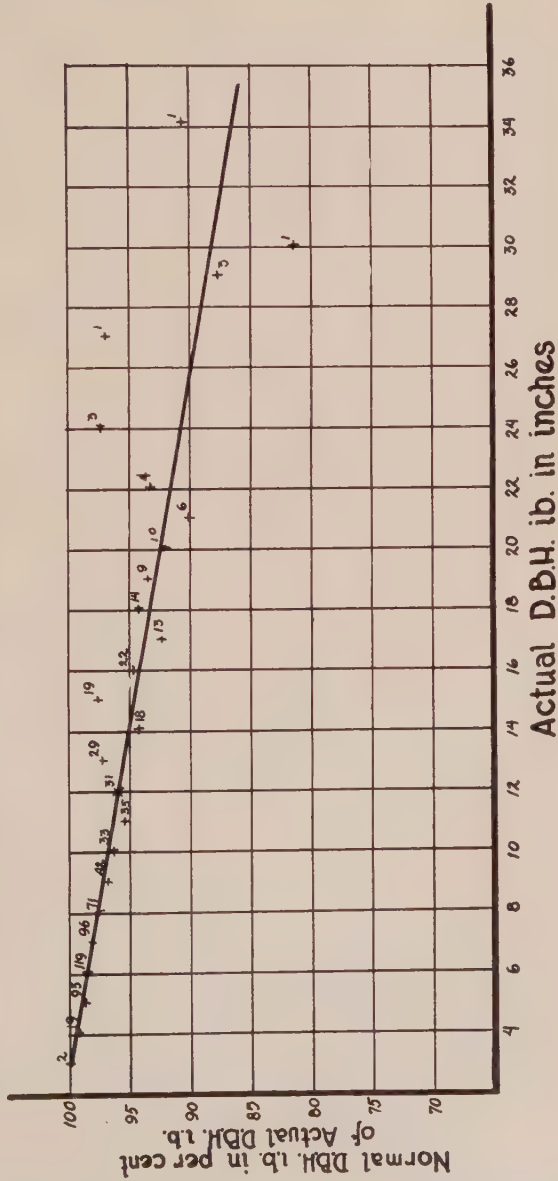


Figure 2.

height classes 40 feet above or below the average for the diameter class. Neither crown class nor site seems to affect the degree of root-swelling.

As diameter increases, root-swelling extends up the stem. In 94 trees it reached more than 10 per cent of length above breast height, though not evident in trees of less than 10 inches d. b. h. inside bark. When plotted and curved, normal diameter at 10 per cent of length above breast height, was found to decrease directly with increase in diameter from 100 per cent for trees of 10 inches d. b. h. inside bark to 87.5 per cent for d. b. h. inside bark of 34 inches.

No trees showed root-swelling as high as 20 per cent of length above breast height.

Proper corrections computed from these factors, may be applied to volume or form factor, when tables based on the Behre equation are published.

#### VARIATION OF FORM QUOTIENT

Should volume tables based on diameter, height and form class be available, there remains the difficulty of applying such tables to specific stands of timber. Doubtless this is why form, as a variable in volume, was not considered until recently, in America, in constructing volume tables.

In our short forestry history, the evolution of volume table construction seems to indicate that we are tending toward more accurate measurements of trees in the woods when cruising; hence volume tables that are accurate in small and restricted areas as well as in areas limited only by regional boundaries are needed. Tables based on but one variable, d. b. h., are applicable only in timber of the same species, site and approximate age as the timber whose measurements are used in their construction. Standard tables, based on both diameter and height as variables, but on *average* form for the species, are used in estimating stands of any site and age. Any discrepancy between their actual and tabular volumes is due to differences in form. More recently, regional tables with diameter, height and site as represented by the tallest 10 per cent of the trees, as variables, have come into use in the West. They were constructed by classifying average form factors of trees from a range of sites.

Diameter and height are measured directly. So far, we have not been able to measure form directly and efficiently, because to do so requires a diameter measurement in the upper part of the tree's bole, necessitating instruments, either too delicate or too cumbersome for

woods work. The alternative of felling a number of sample trees to measure upper diameters is obviously undesirable if the timber is big, or the number of sample trees required, great.

On the other hand, if form quotient can be correlated with any easily determinable factor that affects the growth of timber, form class of a stand may be found indirectly.

Attempts to correlate form quotient with d. b. h., with age, and with site, in the second-growth redwood material, were unsuccessful. But the relationship between height within a diameter class (or density), and form quotient is strong, as the following table shows:

RELATIONSHIP BETWEEN HEIGHT WITHIN DIAMETER CLASS AND FORM QUOTIENT

Height class	Number of trees	Deviation from average form quotient	Same Curved
—30	11	— .049	— .054
—20	43	— .049	— .044
—10	138	— .019	— .024
Modal height class	313	— .002	+ .001
+10	142	+ .026	+ .024
+20	30	+ .037	+ .034
+30	18	+ .032	+ .034

It is a surprising fact, from the table, that deviations of actual form quotients from the curved, are so slight. It follows, then, that height within diameter, should be an excellent index to form class, and one that is easily worked out from a cruiser's sheet. By curving height over diameter, and on the same cross-section sheet, height classes above and below the average curve, the several height classes may each be assigned a proper form class. The average curve corresponds to the modal height class of the table. This, of course, presupposes that stand average form class is known.

#### THE AVERAGE FORM CLASS

It was possible to study the stand form class of second growth redwood from the data of but one plot—Big River in Mendocino county—because it could not be learned whether the trees that were measured by the Forest Service in Humboldt and Del Norte counties in 1899, were samples of specific stands, or whether they were picked at random in their respective localities. Without such knowledge, facts ascertained for individual trees cannot be applied to stands.

The trees from Mendocino county, however, were all taken from a three-quarter acre plot, made up of 129 redwoods, 1 Douglas fir and



6 alders. The redwoods ranged from 3 to 38 inches d. b. h.; in age, 26 per cent were from 20 to 49 years, 48 per cent from 50 to 63 years, and 26 per cent were 64 and 65 years. Of these, 47 were thrown out because they were either lacking in sufficient measurements or were not of normal form, being fork-topped or tops were broken off and missing. The form classes of the remaining 82 are shown:

DISPERSION OF FORM CLASSES, BIG RIVER PLOT

<i>Dominants and codominants</i> (Average d. b. h., 26 inches)			<i>Intermediates and Suppressed</i> (Average d. b. h., 14 inches)		
Form Class	No. of trees	Per cent of total	Form class	No. of trees	Per cent of total
.50	—	—	.50	1	3
.55	2	4	.55	1	3
.60	6	12	.60	9	29
.65	19	37	.65	7	23
.70	15	29	.70	6	19
.75	7	14	.75	6	19
.80	2	4	.80	1	3
Total	51	100	Total	31	99

Several conclusions are tentatively drawn from this table: (1) The good frequency distribution of the trees, which even approaches the probability curve in the dominant and codominant classes, indicates that deviation of form from the average of a stand is purely a matter of chance, though average form, as shown above for second-growth redwood, and as reported by others for various species, depends on density of stocking.

2. The arithmetic mean (a simple calculated average), the median (the value of the middle item when arranged in an array from lowest to highest values), or the mode (the value around which there is the greatest concentration of items) may safely be employed in arriving at an average form class.

3. Fifty trees of the upper crown classes or 75 of all classes of a species, seem to be an adequate number on which to measure form quotient accurately, because this number in a fairly homogeneous stand, seem to form a normal frequency series. Frequency series is the index to the number required. If 50 measurements do not group properly around an average, more are necessary.

The method of measuring form quotient of individual trees with fair accuracy may differ with stands. Felling and measuring sample trees is hardly practical. Measuring form point and finding corresponding form quotients from prepared tables seem to give satisfaction in the Scandinavian countries.

# RELATION BETWEEN ABSOLUTE FORM QUOTIENT AND NORMAL FORM CLASS

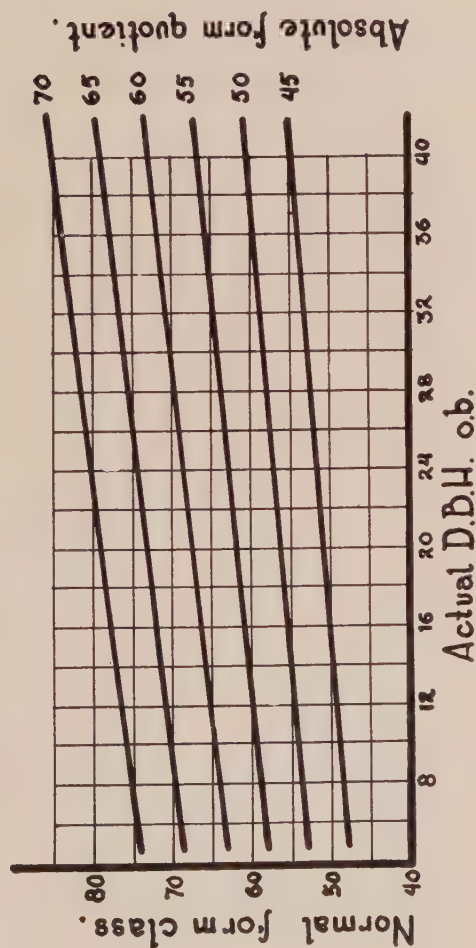


Figure 3.

Form point was not given for any of the stem analyses available. The Karl Pearson coefficient of correlation between height to center of crown in per cent of total height, and form quotient, was computed for the Big River trees and found to be  $.337 \pm .075$ —hardly a satisfactory coefficient, as was to be expected when such a loose form point was used, though it shows that undoubtedly a relation exists. It is believed, however, that in second-growth redwood, the form point of a sprout, on the average, is particularly difficult to pick out because its crown is so apt to be one-sided, the great bulk of it being away from the center of the clump. In a planted stand or seed forest, the form point method may be entirely feasible.

An alternative, using a dendrometer to find absolute form quotient by dividing diameter at half height above breast height and outside bark, by actual d. b. h., may be better. Absolute form quotient may then be converted into normal form quotient by correcting for bark thickness and root-swelling, both of which vary with diameter (Figure 3).

#### SUMMARY

1. Volume tables based on diameter, height and form, as expressed by a stem-form equation, should fit second-growth redwood stands when correction factors for bark thickness and root-swelling are applied.
2. The Behre equation expresses the form of second-growth redwood better than does the Höjer equation, although in the higher form classes redwood tapers more in the upper parts of the stem than either equation.
3. Root-swelling of second-growth redwood increases with d. b. h., and slightly also, with height.
4. Normal form quotient of individual trees increases with stand density, but is independent of other factors of growth.
5. The average of normal form quotients of 50 to 75 trees expresses the stand form class where density does not vary within wide limits.
6. Upper diameters, necessary in computing absolute form quotients, are probably best measured with a dendrometer and normal form quotients found from diagrams or tables.

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# NOTES ON BUTT TAPER OF TUPELO GUM (NYSSA AQUATICA)

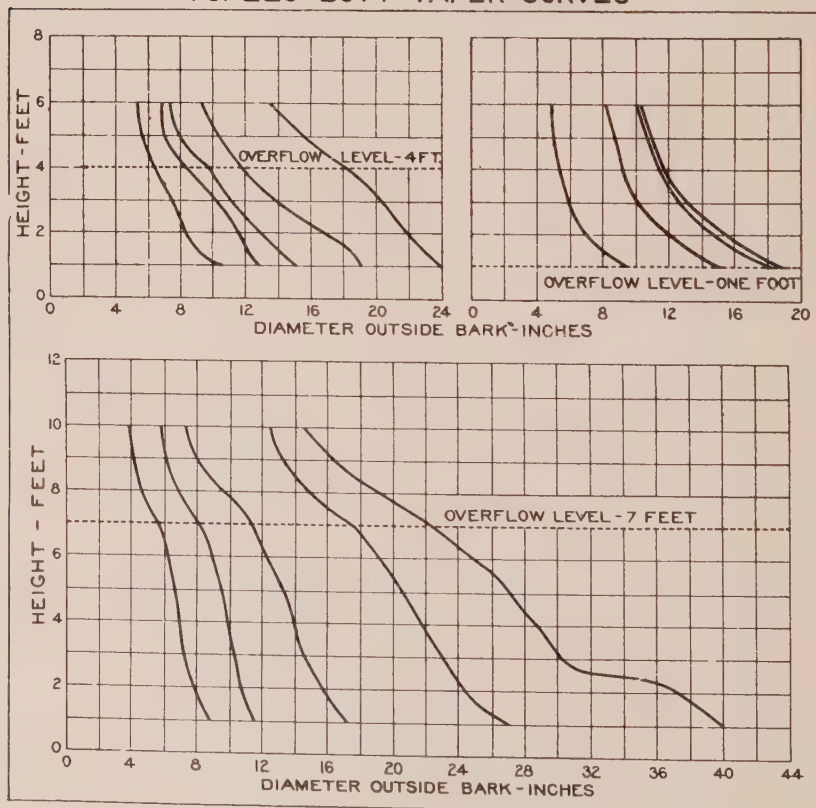
By E. W. HADLEY

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In connection with the tupelo volume and yield table work under way at this Station, the writer has recently taken supplementary butt taper measurements that indicate a very interesting law of taper for this species. These measurements were taken in the bottoms of the lower Pearl River, south Mississippi.

Diameters outside bark at one foot intervals above ground to a point well above butt taper were measured on 15 trees, five of which

**TUPELO BUTT TAPER CURVES**



were growing in a stand submitted to a seven foot overflow, five to a four foot overflow and five to a one foot overflow. The five trees of each high water level class were well distributed over the diameter range of the stands measured. Butt taper curves of these 15 trees are presented here by high water level classes.

Inspection of these curves will show that taper is concave and most rapid from the overflow level up to limit of butt taper, and less rapid and convex from the overflow level down to root swell, where it again increases, becoming concave. Apparently the character of butt taper of a tupelo tree is entirely dependent on the height and duration of overflow, but with average rate of taper increasing with diameter. The form of the bottom eight foot segment of trees submitted to overflow above six feet approaches that of a truncated paraboloid, while that of trees of same diameter and age submitted to less than six feet overflow approaches that of a truncated neiloid. Considering the above together with the fact that a large part of the cubic volume of second-growth tupelo has been found to be contained in the butt cut, any attempt at a standard volume table for this species may have to be accompanied by a table of butt segment form factors based on height of overflow level.

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Compiled by Helen E. Stockbridge, Librarian, U. S. Forest Service

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## NOTES

### INTERNATIONAL CONGRESS OF PLANT SCIENCES

#### *Fourth International Botanical Congress*

Investigators and teachers in the plant sciences, representing all aspects of botany, plant chemistry, plant pathology, and bacteriology, agronomy, horticulture, and forestry are invited to attend the International Congress of Plant Sciences to be held at Ithaca, August 16-23, 1926. This invitation is extended to all countries of the world.

This Congress is scheduled to follow the usual academic sessions abroad, also the short summer session of the various universities and colleges in the United States. It is believed to offer the first opportunity ever arranged in the United States for a general conference of all those professionally engaged in plant work. It possesses the additional compelling interest accruing from unrestricted international representation.

In order that a part of the program may be representative of outstanding leadership, the Congress will be divided into about one dozen sections, each section with an invitation program occupying about four morning sessions or a little more than one-fourth of the available time. These formal programs will be supplemented by another feature that promises also to be of exceptional interest. Ample time will be set apart for round table or informal discussions, which in some cases may be scheduled in advance, and in others may be arranged both as to topics and participation after the Congress actually convenes. This is intended to provide for the widest participation in sectional activities. Supplementary opportunities for individual contact and participation are made possible through the non-commercial exhibits and through the provision for excursions and inspection tours of various types suited to the diverse needs of the different sections.

Although the Congress is not to provide an occasion for *legislation* on regulatory matters of international significance (such as nomenclatorial rules) the organizing committee has expressly provided that "adequate opportunity shall be accorded all sections for the *discussion* of regulatory recommendations of international significance," in order that a better understanding may be reached for definite action at a subsequent international congress.

The sections thus far authorized and the secretaries representing these groups are as follows:

Agronomy—C. H. Myers, Cornell University, Ithaca, N. Y.	Physiology—G. F. Curtis, Cornell University, Ithaca, N. Y.
Bacteriology—J. M. Sherman, Cornell University, Ithaca, N. Y.	Pathology—Donald Readdick, Cornell University, Ithaca, N. Y.
Cytology—L. W. Sharp, Cornell University, Ithaca, N. Y.	Pharmacognosy and Pharmaceutical Botany—H. W. Youngken, Massachusetts College of Pharmacy, Boston.
Morphology, Histology and Paleobotany—D. S. Johnson, Johns Hopkins University, Baltimore, Md.	Taxonomy—K. M. Wiegand, Cornell University, Ithaca, N. Y.
Ecology—H. L. Shantz, Bureau of Plant Industry, Washington, D. C.	Mycology—H. M. Fitzpatrick, Cornell University, Ithaca, N. Y.
Forestry—R. S. Hosmer, Cornell University, Ithaca, N. Y.	Genetics—C. E. Allen, University of Wisconsin, Madison, Wis.
Horticulture—A. J. Heinicke, Cornell University, Ithaca, N. Y.	

Communications regarding the Congress should be addressed as indicated below:

1. Concerning round tables and other strictly sectional matters—to the appropriate sectional secretary.
2. Concerning exhibits and general program matters—L. W. Sharp, Cornell University, Ithaca, N. Y.
3. Concerning excursions, collecting trips, inspection tours, local arrangements, transportation, etc.—H. H. Whetzel, Cornell University, Ithaca, N. Y.
4. Concerning the Congress in general—B. M. Duggar, Missouri Botanical Garden, St. Louis, Mo.

#### CREOSOTE AND WATER-GAS TAR AS FENCE POST PRESERVATIVES

A combination experimental and demonstrational fence post preservation project is under way on the Sac and Fox Indian Reservation near Tama, Iowa, which will probably prove one of the most interesting of its kind in the country. The project is a joint project between the Forestry Experiment Station and Forestry Extension Service.

The purpose of the work is (1) to demonstrate the value of giving non-durable posts a preservative treatment to increase their durability and (2) to test the comparative value of coal-tar creosote and ordinary water-gas tar as post preservatives.

The similarity in physical properties of these two products, and the cheapness of water-gas tar have led to hundreds of inquiries as to the suitability of the latter as a post preservative. This test will furnish valuable information in this regard.

Fifteen hundred native cottonwood posts are under test, treated with these mixtures of the above preservatives:

100% creosote.

75% creosote, 25% water-gas tar.

50% creosote, 50% water-gas tar.

25% creosote, 75% water-gas tar.

100% water-gas tar.

After two and one-half years' service in the fence line there is no evidence of any difference in the preservative qualities of any of the mixtures. All have preserved the posts in perfect condition, while untreated cottonwood would have been from half to completely decayed by this time.

The Experiment Station of the Iowa State College would be glad to learn of any similar tests being run elsewhere.

I. T. BODE.

#### WORLD'S FORESTRY CONGRESS

Word has been received from the General Secretary of the International Institute of Agriculture that the World's Forestry Congress to be held at Rome from April 29 to May 5, 1926, promises to be remarkably successful and of exceptional importance. There will be official delegates from over forty countries and from a large number of universities and forestry associations. Applications for membership in the Congress have so far been received through this committee from fifteen Americans, and in addition there are several others who are definitely planning to attend the Congress, but who have not yet applied for membership or have sent their applications direct to the organizing committee. It now seems probable that the Society of American Foresters will be represented by from six to ten senior members.

Any who are planning to become members of the Congress, whether or not they expect actually to attend it, should forward their applications as soon as possible. Blanks and other information can be obtained from the undersigned. Those desiring to present papers at the Congress are reminded that these must be in the hands of the organizing committee, Villa Umberto I, Rome, Italy, before February 15. These too may be sent either direct or through the undersigned.

Mr. Asher Hobson, the American delegate to the International Institute of Agriculture and a member of the organizing committee of the World's Forestry Congress, has offered to assist Americans planning to attend the Congress in obtaining accommodations in Rome. Those desiring to avail themselves of this offer should communicate with Mr.

Hobson, Villa Umberto I, Rome, as soon as possible, stating approximately, or if possible, exactly, when they will reach Rome, together with the character of accommodations desired. Mr. Hobson states that first class, but not luxurious, hotel accommodations may be had in Rome for \$5.00 per day American plan, and pension accommodations for about \$3.00 per day.

Mr. Hobson also offers to arrange to have any members of the American delegation to the Congress met at the railroad station on their arrival in Rome. To make this possible it is essential that members of the Congress notify him by wire immediately upon their arrival in Europe as to the exact time when they will reach Rome. This is particularly important in view of the fact that requests for accommodations may, in many cases, not reach him in time to permit of a reply before the applicant leaves this country. American foresters may, however, feel confident that they will be taken care of if they will write Mr. Hobson as soon as possible, stating exactly the character of accommodations desired, and if they will follow this up by a telegram to him immediately upon their arrival in Europe, as suggested above. His telegraphic address is Hobson, Ceres, Rome.

The various steamship lines offer a wide variety of dates of sailing and ports of debarkation. Minimum fares for the medium-sized boats average about as follows:

First class, one way.....	\$190
Second class, one way.....	135
Cabin (one class), one way.....	150
Third class, one way.....	90
Third class, round trip.....	165

A certain amount of additional information along this line can be furnished by the undersigned, but those seriously considering the trip will doubtless find it most satisfactory to write for full information to the companies in which they are particularly interested.

S. T. DANA,

#### COMMENT ON "SHORT CUTS IN MEASURING TREE HEIGHTS"

Editor: May I refer you to the editorial footnote to the article on measuring tree heights by Mr. I. T. Haig, in the November number of the Journal of Forestry. I suppose Mr. Haig and others have by now pointed out that only one setting of the slide rule is still necessary, even



though the base of a tree is higher than the observer, the formula quoted being equivalent to:

$$\frac{\sin (M-N)}{\cos M}$$

The only change in Mr. Haig's procedure is, therefore, to read the height under the difference between the two angles instead of the sum.

The duplicate scale slide rule described by Mr. Haig is not essential as a solution may be found in one setting with an ordinary logarithmic sine slide by setting the complement of the angle to the tip under the slope distance, and reading the height over the total angle (or difference when the base of the tree is above the observer). We used this method as students at Edinburgh, carrying a 10-inch slide rule in the field. This can be attached to a cord around the neck and is quite convenient, but no doubt Mr. Haig's circular slide rule would be more handy and accurate if the discs were made of celluloid or aluminum so as to last.

In this service we generally obviate the necessity of making any computation in the field by reading vertical distances direct from a topographic Abney used with a steel tape and appropriately graduated trailer. However, sometimes it is difficult to locate a spot from which the tip of the tree can be seen, and which is also the proper distance for the use of the Abney.

F. D. MULHOLLAND,  
*Forest Branch, Victoria, B. C.*

#### MINNESOTA FOREST SERVICE HOLDS SECOND ANNUAL RANGER MEETING

From February 4th to 17th the Minnesota State Forest Service conducts its second annual Ranger Meeting at St. Paul attended by all the district rangers and patrolmen. The program covers instruction in many phases of ranger work from fire damage valuation to public speaking, cruising, and the prosecution of forest law violators. Dormitories at the University Farm are provided for the 30 in attendance and all the meetings are held in the Forestry building.

## SOCIETY AFFAIRS

MINUTES OF THE REGULAR WINTER MEETING, SOUTHERN APPALACHIAN  
SECTION, SOCIETY OF AMERICAN FORESTERS, RICHMOND,  
VIRGINIA, JANUARY 5, 1926

The meeting was called to order by Chairman W. J. Damtoft at 8:00 P. M. in the Hotel Jefferson. There were present 11 members and associate members of the section and 22 guests who were in the city to attend other forestry meetings, notably that of the Appalachian Research Council, which had been held during the day. Nearly all the states of the Appalachian Region and the South were represented. The members present were:

Dupre Barrett	W. J. Damtoft	J. S. Holmes
H. L. Baker	E. H. Frothingham	R. S. Maddox
E. M. Bruner	E. F. McCarthy	

*Associate members*

Andrew Gennett	J. H. Pratt	R. B. Robertson
----------------	-------------	-----------------

Mr. R. D. Forbes, Director of the Southern Forest Experiment Station, at New Orleans, reported his attendance at the meeting of the American Association for the Advancement of Science at Kansas City, and urged action which would ensure the meeting of the Society of American Foresters with this body in Philadelphia at its next winter session (1926-1927). A motion approving such action was passed by the section.

The subject selected for discussion, "The Place of Forestry Education in the Graded Schools," was introduced by R. S. Maddox, who outlined the process by which the teaching of forestry was incorporated in the fifth grade work in Tennessee. The original law of 1921 in Tennessee was incorporated in the law of 1925, and this had the accord of the State Board of Education. The text was prepared for the fifth grade because it would reach the most children it taught in that grade.

Chapin Jones expressed his belief that the work of education in forestry should come through the action of the State Board of Education, rather than through action by the legislature. He believes that the effort needed is only temporary, until the present heritage which accrued from the time of timber destruction is overcome. Subsequently there will be much less need for this type of work in the graded schools.

H. L. Baker passed over the discussion of the need for forestry teaching with the comment that there were many arguments for it with little dispute as to the need. The question is largely a matter of how it can be accomplished. He mentioned a report on education which is being prepared by a national committee and which will include the topic of forestry education. He outlined the types of forestry educational work which had already been used, and called attention to the texts which had been prepared.

The meeting was then addressed by Mr. Harris Hart, State Superintendent of Public Instruction for Virginia, who expressed his views as to the place of forestry in grade school work. He is opposed to the addition of textbooks or the enactment of compulsory legislation. He suggested that in Virginia a committee meet with the State Board of Education, which has the authority to incorporate subject matter in the curriculum, and that it would give favorable consideration to reasonable suggestions.

Col. Joseph Hyde Pratt spoke briefly in general support of the method of approach suggested by Mr. Hart. Mr. Besley, State Forester of Maryland, called attention to the forest week lessons which had been used in the schools of his state. Mr. Bazeley, State Forester of Massachusetts, advised against legislation and in favor of incorporating forestry material in the subject matter now taught. He mentioned nature study as one place and also said that Massachusetts had made use of gipsy moth inspectors to talk in the schools. Mr. Holmes stressed the need for interest and instruction among teachers before any considerable advance could be made. Mr. Siecke, State Forester of Texas, told of the auxiliary means used in his state. The establishment of town forests in Massachusetts and the planting done by the children of the state were reported by Mr. Bazeley. Mr. Barnett called attention to the manual of trees sent out by the Florida Forestry Association.

After the discussion it was moved that a committee be appointed to cooperate with state officials on the subject of forestry education in the graded schools, and that it report not later than a year from this date. Carried. Appointed: H. L. Baker, Chairman; R. S. Maddox, J. S. Holmes, F. B. Merrill, E. M. Bruner, R. H. Tryon, B. M. Lufburrow.

The meeting was adjourned at 10:30.

FERDINAND W. HAASIS, *Secretary*.

## NORTHERN ROCKY MOUNTAIN SECTION

*Report for the Calendar Year 1925*

Eight meetings were held with an average attendance of 32 persons. This is 80 per cent of the average number of resident and visiting members notified, and is a marked increase compared to the average of 24.4 during the year 1924.

Papers were read before the Section on the following subjects:

- Jan. 5. (a) The Forest Schools' Conference—T. C. Spaulding.  
(b) The State Foresters' Conference—R. P. McLaughlin.  
(c) The Utilization Conference—Roscoe Haines.  
(d) Impressions of Black Hills and Lake States Forestry—W. W. White.
- Jan. 19. The Development of Permanent Transportation Systems on the National Forests—Philip Neff.
- Feb. 9. (a) The Relation of Smelter Fume Injury to Forest Management—J. B. Taylor.  
(b) Discussion—F. G. Clark.
- Feb. 16. (a) United States Indian Service Forestry—C. D. Faunce.  
(b) Forest Utilization—Aldo Leopold.
- Mar. 2. (a) Forest Nursery Practices at Savenac Nursery—G. W. Jones.  
(b) Forestation Research at Savenac—W. G. Wahlenberg.
- Mar. 17. The Gregg Attack on the Forest Service—Dean A. L. Stone, University of Montana School of Journalism.
- Mar. 30. (a) Wood Utilization—M. I. Bradner.  
(b) The Air Drying of Lumber—S. V. Fullaway.
- Apr. 13. Fire Hour Control Studies—C. F. Makibben.

The two papers by Jones and Wahlenberg were published in the Journal.

A committee consisting of T. C. Spaulding, Theo. Shoemaker, and Meyer Wolff was appointed to function during 1926 as representative of this Section of the Society during American Forest Week.

At the meeting of December 14, 1925, the following officers were elected for the calendar year 1926:

R. H. Weidman, chairman.

W. M. Nagel, secretary-treasurer.

T. C. Spaulding, third member of Executive Committee.



*Membership Committee:*

M. I. Bradner, chairman.

D. L. Beatty.

H. R. Flint.

I. T. Haig.

H. T. Gisborne.

At this business meeting Glen Smith's paper "The Attack on the Forest Service Grazing Policy" was read and received the unqualified endorsement of the Section.

*Attention All Other Secretaries*

The attention of all secretaries of other sections of the Society is invited to the fact that Mr. W. M. Nagel, U. S. Forest Service, Missoula, Montana, will be secretary-treasurer of this section during the year 1926.

A year ago when Mr. White was secretary nearly all the mail came addressed to Mr. Weidman, who preceded Mr. White. This year when Mr. Gisborne has been secretary all mail has come addressed to Mr. White. The fact that all other secretaries seem to be a year behind us is immaterial, but matters can be handled more expeditiously if the mail is addressed to the current secretary. Mr. W. M. Nagel is the name for 1926.

The 1926 program for this Section of the Society will include the following speakers: Ex-Governor Jos. M. Dixon, on the History of the Forest Service under Roosevelt; Dr. C. A. Schenck on any subject he cares to select; Dean M. F. Miller on any subject; H. R. Flint on Aerial Forest Patrol in D-1; Elers Koch, A Look into the Future; D. S. Olson, Some Fallacies in the Present Planting Practices in the White Pine Belt; Dr. Schenck on Technical Standards for the Personnel of European Forestry Services, followed by L. C. Stockdale and Dean Spaulding on Proposed Technical Standards for the Personnel of the U. S. Forest Service. One meeting is being held open for visiting foresters of note. Ex-Governor Dixon's talk probably will be broadcast by radio station KUOM, University of Montana.

H. T. GISBORNE, *Retiring Secretary.*

## DEATH OF R. H. CAMPBELL

After an illness of only three days, Mr. R. H. Campbell, late Director of Forestry, Department of the Interior, Canada, died on November 26th at Ottawa. He was 59 years old and had long been associated with forestry and conservation in Canada, being an active member of both the Canadian Forestry Association and the Canadian Society of Forest Engineers.

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